

Appendix 5-K

Wild Horse Ridge

Tank Seam Pad And Access Road

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Introduction

This Appendix discusses the construction of the Wild Horse Ridge Tank Seam access road and portal pad. (Areas TS-16 and TS-17 on Plate 2-3G) Cut and Fill volumes have been determined for the road and pad and are summarized in Tables 5K-1 and 5K-2. Also included is an operational slope stability analysis and a reclaimed slope stability analysis. Pre-mining, Operational and Post-mining cross-sections are detailed in Attachment B of this Appendix.

TS-16 Construction Description

Construction in this area will include the widening of the switchback and adding two passing areas in the road. Construction will begin at the switchback and the material cut out of the side of the mountain to widen the turn will be used just below the switchback and in the area around cross-section 4 to widen the road in these areas. Topsoil will be recovered to a depth of 6-10 inches from the areas where the road will be widened generating approximately 124 cu. yd. of material.

The area included in TS-16 will not be reclaimed but will be used for post mining access to the hunting cabin as described on page 4-7. During construction silt fences will be used below all cut and fill areas. Upon completion of construction all disturbed slopes will be covered with erosion control matting and reseeded (See Appendix 7-K). Cut slopes, fill slopes, and fill placement will follow the recommendations given in the Slope Stability analysis and report, included in Attachment B. A summary of the cut and fill volumes is shown in Table 5K-1. Cross-Sections are shown in Attachment A.

Table 5K-1

TS-16 Summary of Cut and Fill

Cross Section	Cut Vo. (Cu Yds.)	Topsoil (Cu Yds.)	Fill Vol. (Cu Yds.)	Excess (Cu Yds.)	Amount Hauled	Avg Haul Dist. (Ft)	Cum. Vol. (Cu Yds.)
1	830	~36	139	655 cut	161	450	-655
2	431	~28	550	147 Fill	-0-	-0-	-508
3	52	~30	319	297 fill	-0-	-0-	-211
4	35	~30	161	156 fill	-0-	-0-	-55
Totals	1,348	~124	1,169		161	450	

TS-17 Construction Descriptions

Construction will begin ant the hunting cabin turn off, 300 ft from the pad site. Topsoil will be removed form the project cut areas (Table 5K-2) and placed in the WHR Tank Seam Topsoil Stockpile located inside the bend of the corner. Material will then be removed form the road cuts and compacted around the outside of the two switchbacks located inside the area in order to allow them to be widened. As the cut progresses up the road, topsoil will be removed prior to the road cut being made and placed in the storage pile. Cuts will be made starting at the lower end of the access road and proceed up to and through the Tank Seam Portal Pad. Most of the material will be hauled approximately 300 ft. and placed at the turn intersected by the hunting cabin road. The rest of the material will be hauled no more then 700 ft. to the turn above the Blind Canyon Seam Pad. A retaining wall (shown on plate 5-2G) will be built bellow the turn intersected by the hunting cabin road in order to maintain the maximum allowed slope on the soil below the turn. Cross-sections are shown in attachment A.

Table 5K-2

TS-17 Summary of Cut and Fill Volumes

Area	Cut Vol. (Cu Yds.)	Topsoil (Cu Yds.)	Fill Vol. (Cu Yds.)	Excess (Cu Yds.)	Amount Hauled	Avg Haul Dist. (Ft)	Cum. Vol. (Cu Yds.)
0+00	138	~138	1,357	1,219 fill	1,219	700	-1,219
0+50	80	~80	1,430	1,350 fill	1,350	700	-2,569
1+00	279	~101	624	345 fill	532	50	-2,914
1+50	686	~107	144	543 cut	-0-	-0-	-2,371
2+00	2,033	~135	121	1,912 cut	-0-	-0-	-459
2+50	4,648	~326	841	3,807 cut	3,807	300	3,348
3+00	2,852	~281	3,876	1,024 fill	1,024	300	2,324
3+50	313	~149	2,696	2,383 fill	2,141	300	-59
Totals	11,029	~1,317	11,089		10,173	388	

Topsoil depths vary from 6-10 inches along the access road and are 8 inches at the pad site, but may be as deep as 20 inches along the northeast edge of the pad (Appendix 2-G).

Assuming a topsoil depth of 8 inches approximately 1,400 cu. yds. of topsoil will be recovered from the construction area. The topsoil stockpile can hold a maximum of 1,800 cu yds. of material. This will allow us to go deeper then the 8 inches in any areas that are required and still store the material depending on the actual depth of topsoil encountered during construction. If the amount on topsoil material recovered from areas TS-16 and TS-17 exceed the capacity of the topsoil stockpile the additional material will be hauled to the WHR topsoil stockpile. If both the capacity of both the WHR topsoil stockpile and the WHR Tank Seam topsoil stockpile are exceeded the material will be placed in the area labeled Potential Additional Topsoil Storage shown on plates 5-2 and 2-3G.

Silt fences will be placed below the disturbed area before both construction and reclamation begin. During the initial road cut, care will be taken to prevent disturbed material from migrating downslope in the following manner. The initial removal will be made using backhoe. Trees and/or shrubs immediately ahead of the cut will be removed by pulling them back into the previous cut. Using the backhoe, a berm will be created on the downhill side of the cut, as shown in Figure 5G-1. When the berm is in place, the road cuts will be started as shown in Figure 5G-1 and 5G-2 using a backhoe and/or front end loader. The road cuts will be made into the slope towards the cut face rather than parallel to the slope, which will result in any rocks or sloughage dislodged by the equipment during the road cutting to be contained within the berm. In the event blasting is required, which is described in Appendix 5-E, the blasts will be designed to drop the material into the cut area behind the berm. This will prevent material generated by the blast from migrating into the undisturbed area.

Cut slopes, fill slopes, and fill placement will follow the recommendations given in the Slope Stability analysis and report, included in Attachment B. Large boulders will also be placed according to the report. Where possible, care will be taken to avoid disturbing large trees of commercial value and any canyon sweetvetch plants located in the area (see chapter 3). Exposed slopes will be covered with erosion control matting as described in Appendix 7-K.

This procedure will be followed for the construction of the Tank Seam portal pad as well. A road will be cut across the entire length of the pad and berm established. The backhoe will then turn into the mountain and start widening the pad, first recovering the topsoil.

Final crowning of the road, laying of road base and installation of permanent ditches will be completed following the initial road contouring. The approximate road contours are shown on Plate 5-2G.

During reclamation, the cut and fill process described above will be reserved. The reclaimed slopes will be reconstructed to approximate original contour. Subsoil material will be compacted in a minimum of 12 inch lifts. A minimum 8" of topsoil will be placed un-compacted over the regarded area. Topsoil material will be pocked to aid in water retention and runoff control during vegetation establishment (See Appendix 7-K). The 1,000 cu. yds. used in TS-15 and any material used in TS-7 and TS-8 will be replaced by material from TS-5 during reclamation. All material moved will be sampled for toxicity according to table 5O-1

Most areas of the road will remain in place for post-mining access to a hunting cabin. These areas are shown on Plate 2-3G and are labeled "area not requiring recontouring or topsoil within the disturbed boundary". The remaining areas of the road will be completely removed and used for fill material during the cut and fill process and the pre-mining road will be restored as shown on the cross-sections in Attachment A. A more detailed description of the hunting cabin can be found on page 4-4 of the MRP. No culverts will be removed since they are needed for access to the hunting cabin.

During construction 1,000 cu. yds. Of material was hauled to TS-15 as described on page 5J-13. Any additional material generated due to miner variations will be hauled to TS-7 and TS-8 for reclamation in those areas.

Attachment A

Cut and Fill Calculations

The cut and fill volumes shown in Table 5k-1 and 5k-2 represent the maximum volumes that will be encountered. Final contours and pad dimensions may vary somewhat to account for any variation in cut and fill volumes. As-built contours and cut and fill volumes will be submitted to the Division following construction.

Volume measurements were made using “Quicksurf” 3D modeling software with AutoCad. They are based on the contours shown on Plate 5-7G for pre-mining configuration, Plate 5-2G for operational configuration, and Plate 5-6G for post-mining configuration. Cross-sections for each configurations are shown on the following pages. The locations of the cross-sections are shown on Plates 5-6G and 2-3G.

CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:

$$1'' = 40'$$

DRAWN BY:

M. Reynolds


DATE:

5/13/02

BEAR CANYON

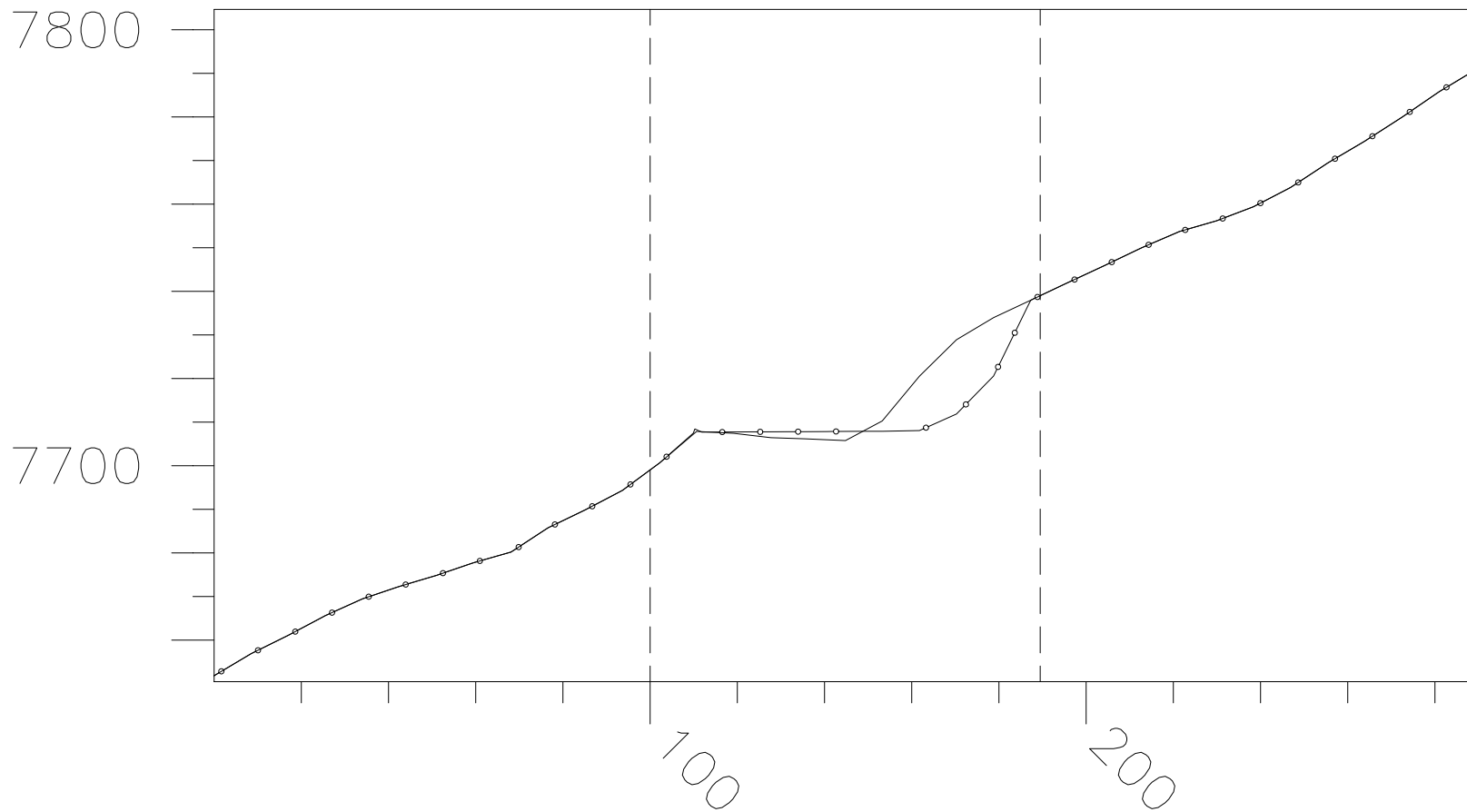
WHR Tank Seam
Lower Access Road

Pre-Mining _____

Post-Mining/Operation 

Dst. Boundary —————

TS-16 Section 1



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:
1" = 40'

DRAWN BY:
M. Reynolds

DATE:
5/13/02

BEAR CANYON

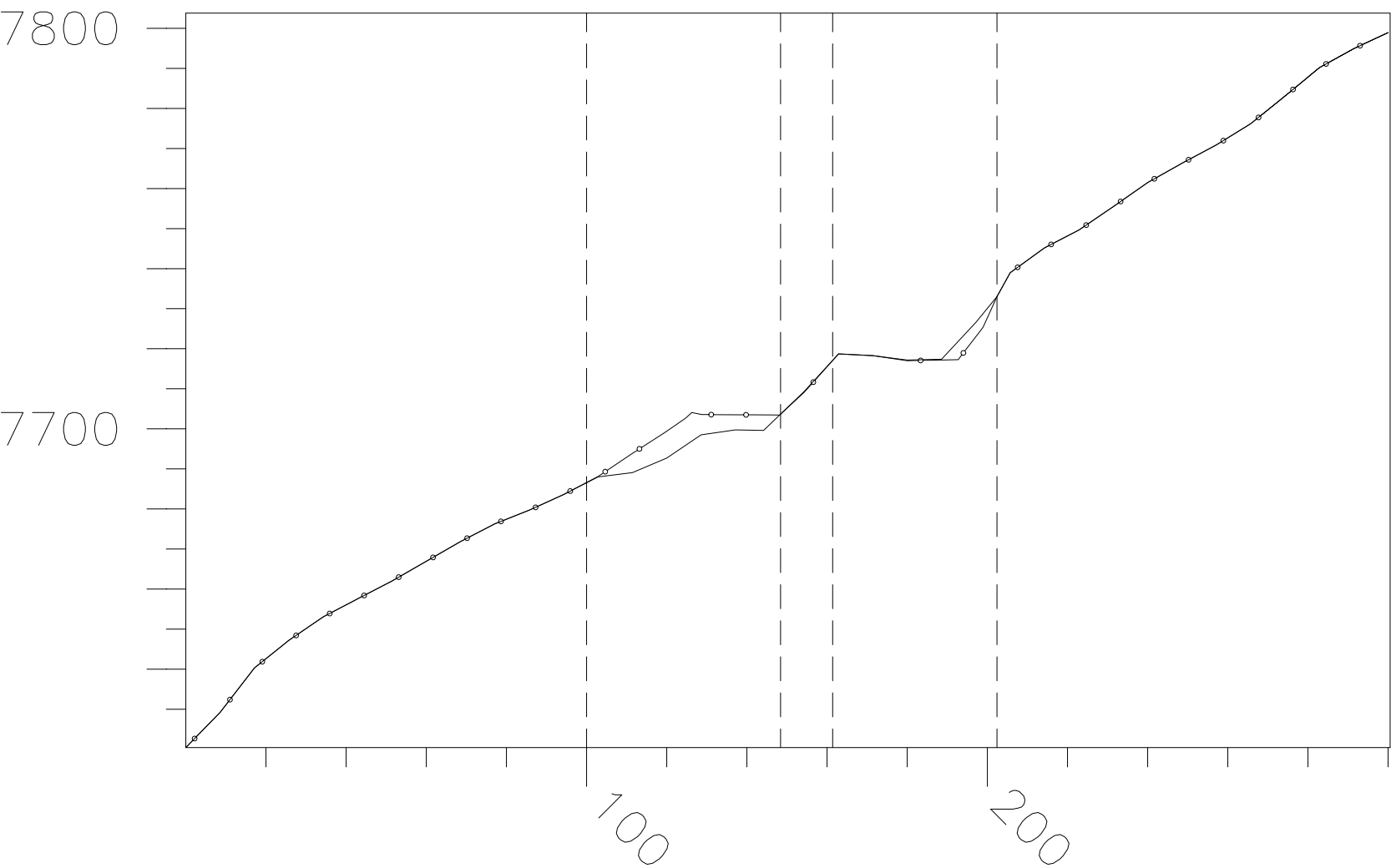
WHR Tank Seam
Lower Access Road

Pre-Mining

Post-Mining/Operation

Dst. Boundary

TS-16 Section 2



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:
1" = 40'

DRAWN BY:
M. Reynolds

DATE:
5/13/02

BEAR CANYON

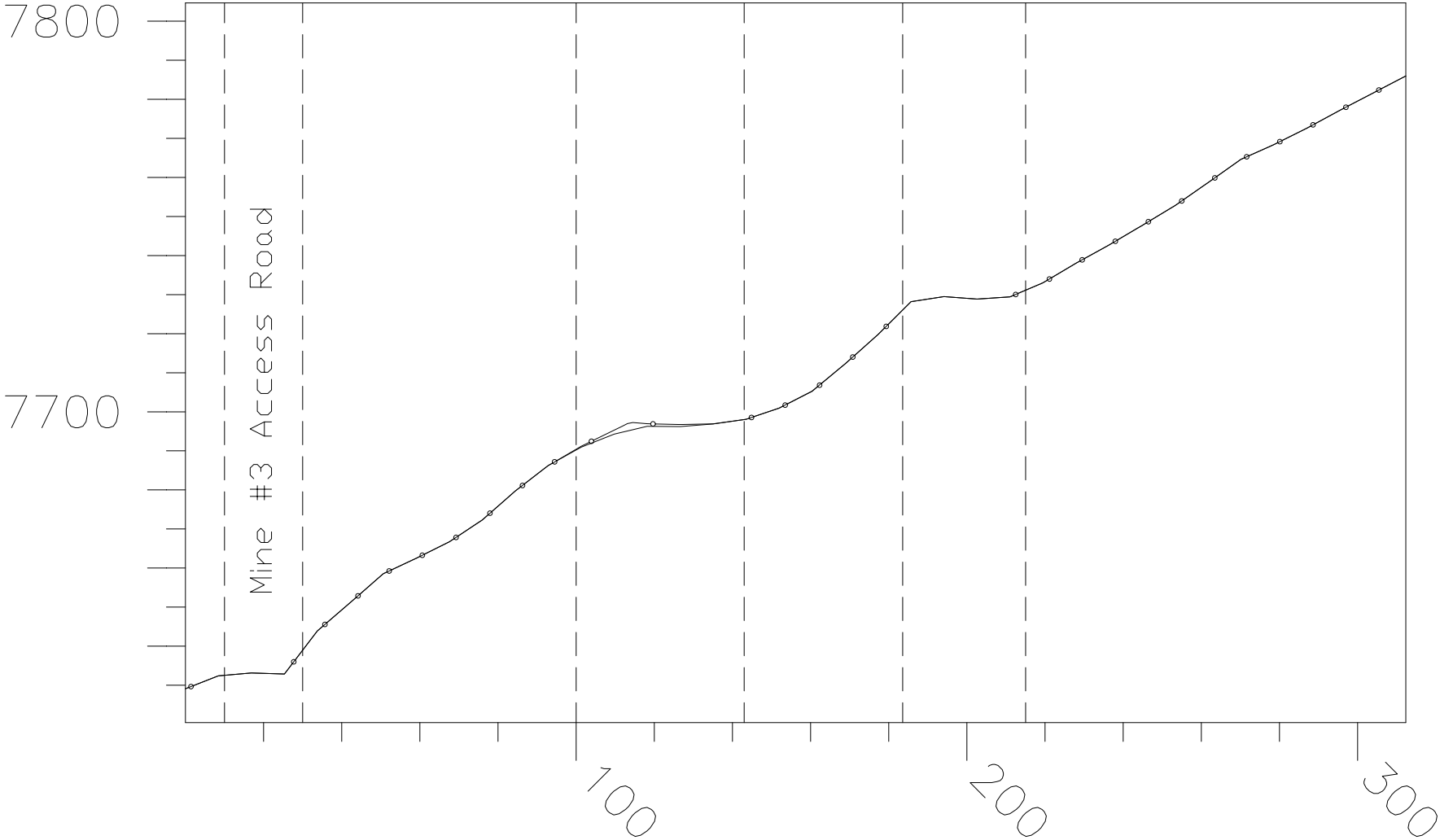
WHR Tank Seam
Lower Access Road

Pre-Mining

Post-Mining/Operation

Dst. Boundary

TS-16 Section 3



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:
1" = 40'

DRAWN BY:
M. Reynolds

DATE:
5/13/02

BEAR CANYON

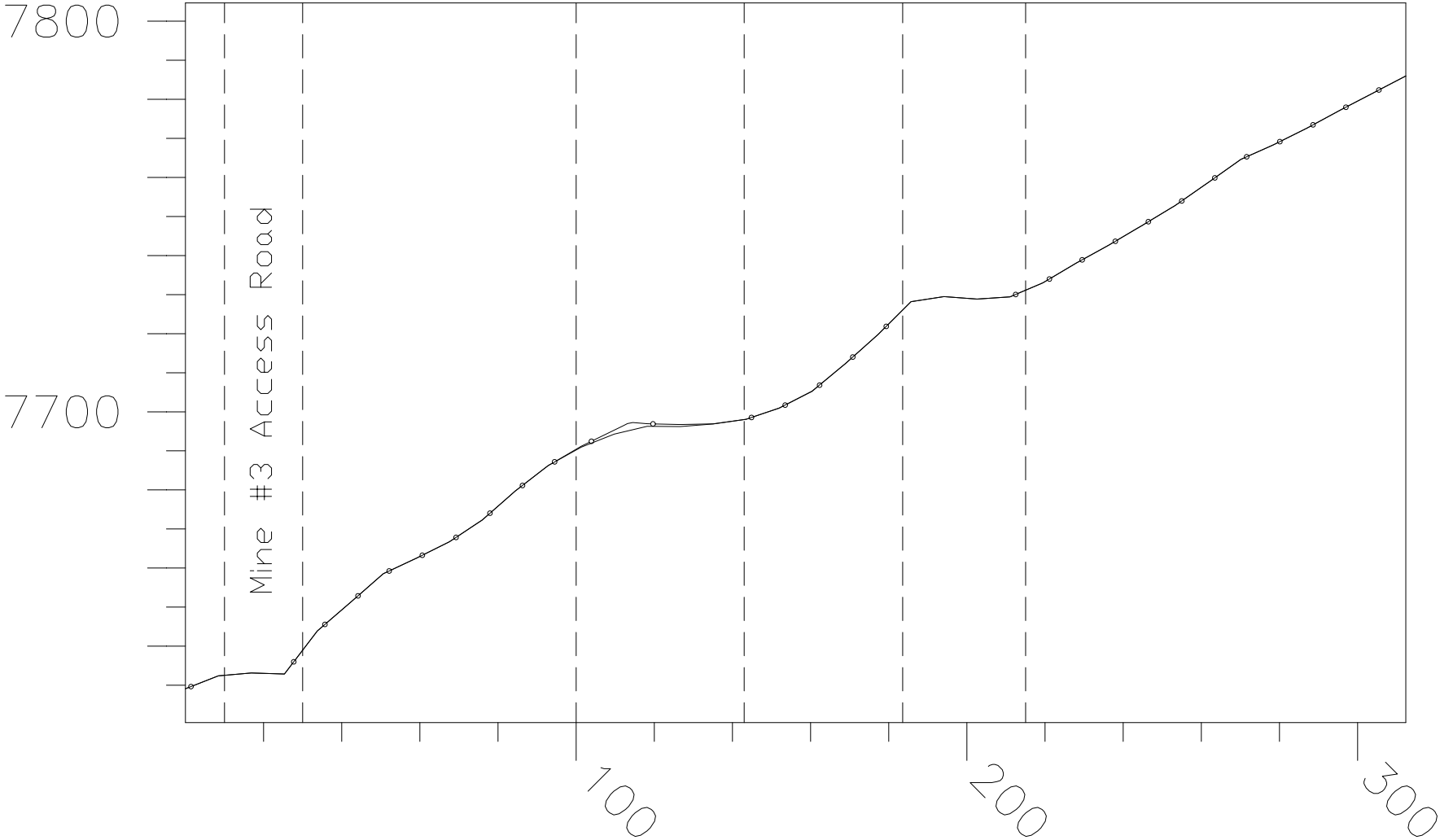
WHR Tank Seam
Lower Access Road

Pre-Mining

Post-Mining/Operation

Dst. Boundary

TS-16 Section 3



CO-OP MINING CO.
HUNTINGTON, UTAH

SURFACE FACILITIES

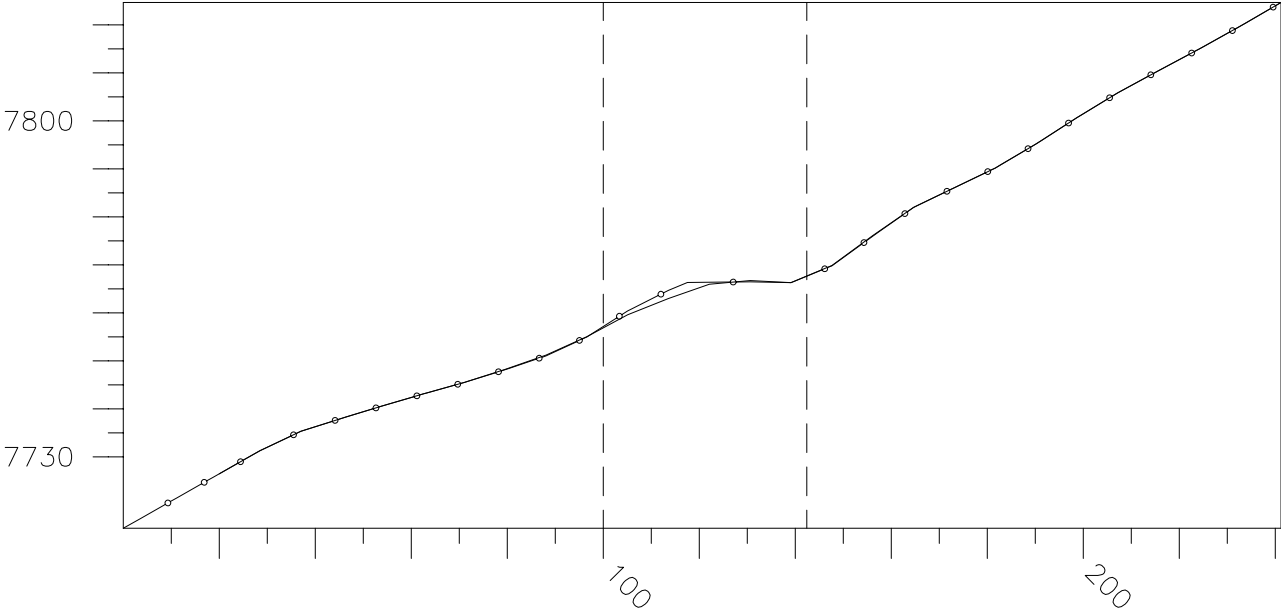
SCALE: 1" = 40'	DRAWN BY: M. Reynolds	DATE: 5/13/02
BEAR CANYON		WHR Tank Seam Lower Access Road

Pre-Mining —————

Post-Mining/Operation ◊—◊—◊—◊—◊—◊—◊—◊—

Dst. Boundary - - - - -

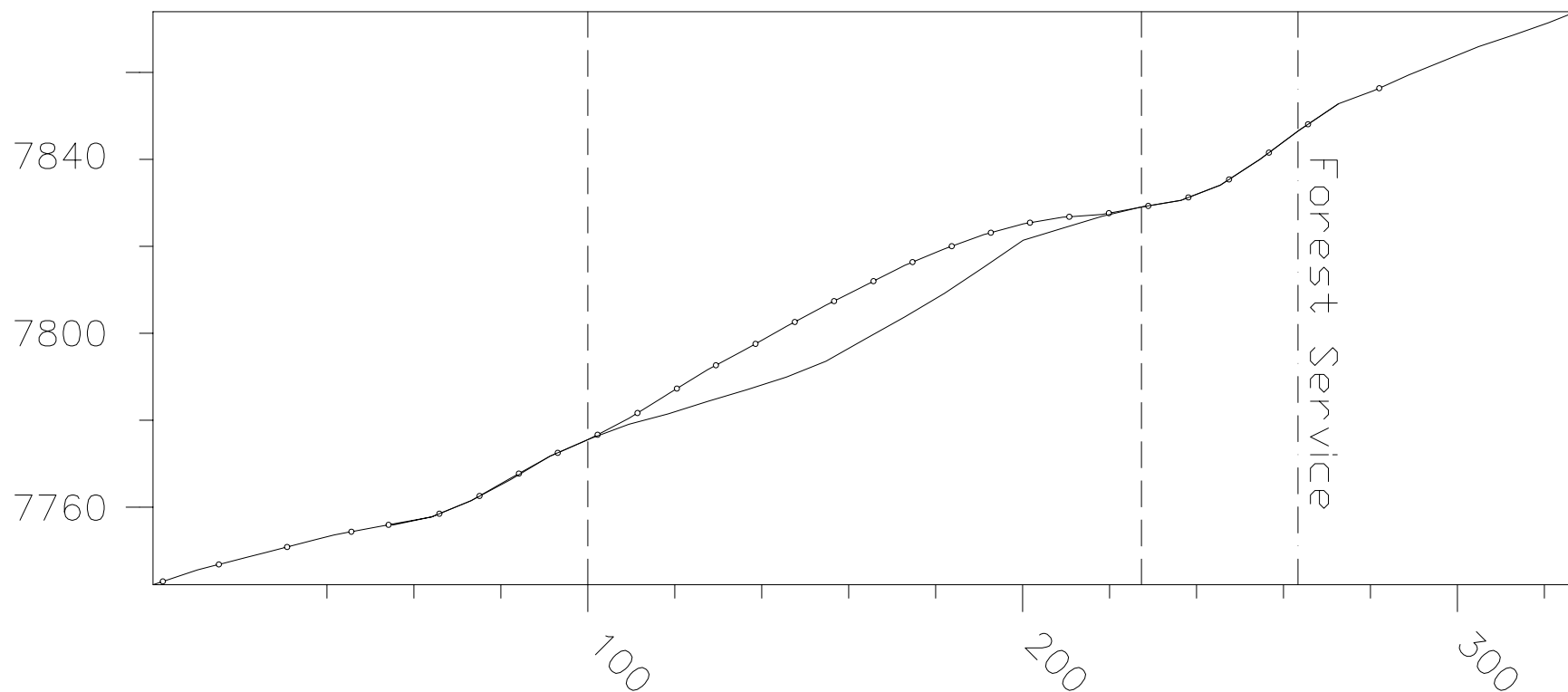
TS-16 Section 4



CO-OP MINING CO.		
HUNTINGTON, UTAH		
SURFACE FACILITIES		
SCALE: 1" = 40'	DRAWN BY: M. Reynolds	DATE: 8/09/01
BEAR CANYON	WHR Tank Seam Access Road	

Pre/Post Mining	—————
Operation	○ — ○ — ○ — ○ — ○ — ○ — ○ —
Dst. Boundary	- - - - -
Forest Service	- - - - -

TS-17 Section 0+00



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE: 1" = 40'	DRAWN BY: M. Reynolds	DATE: 8/09/01
BEAR CANYON		WHR Tank Seam Access Road

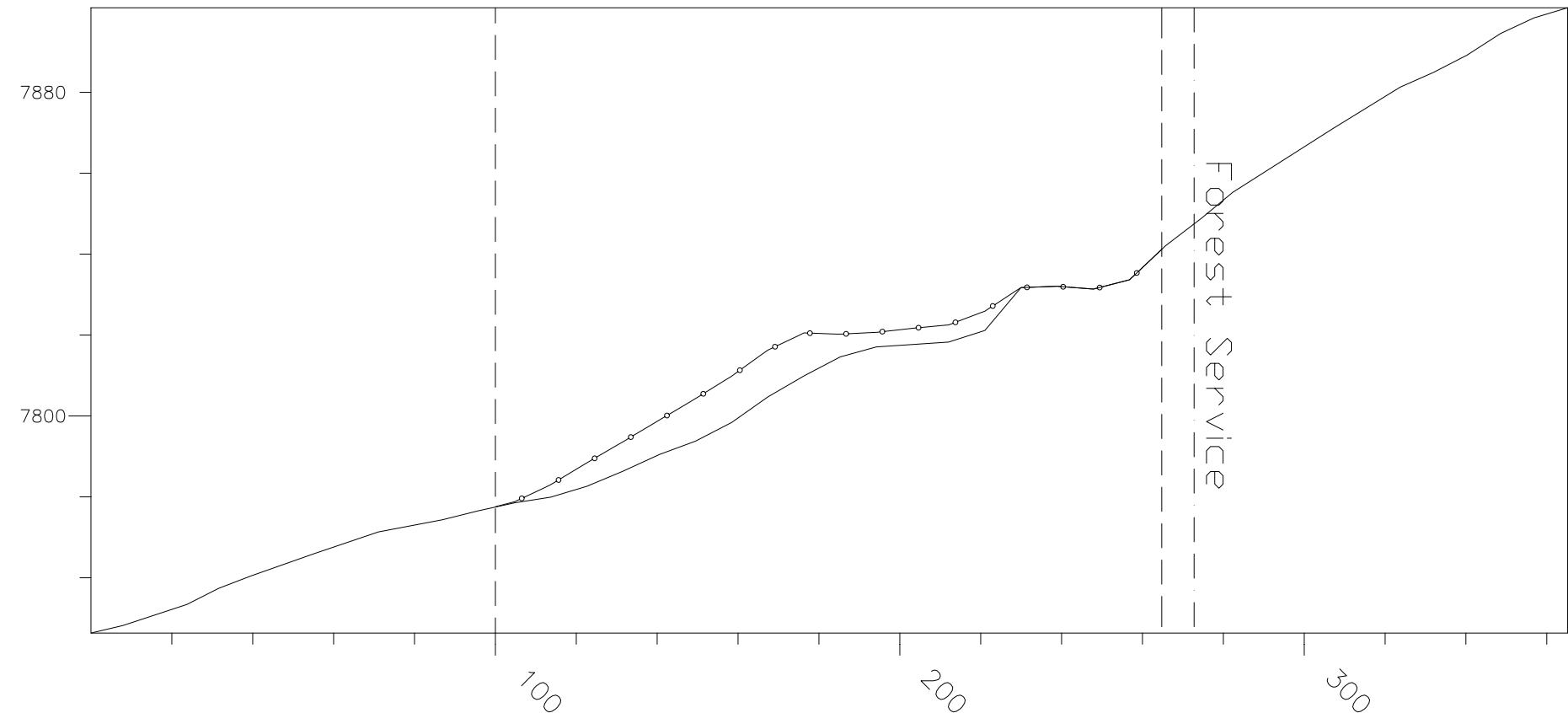
Pre/Post Mining

Operation

Dst. Boundary

Forest Service

TS-17 Section 0+50



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HUNTINGTON, UTAH

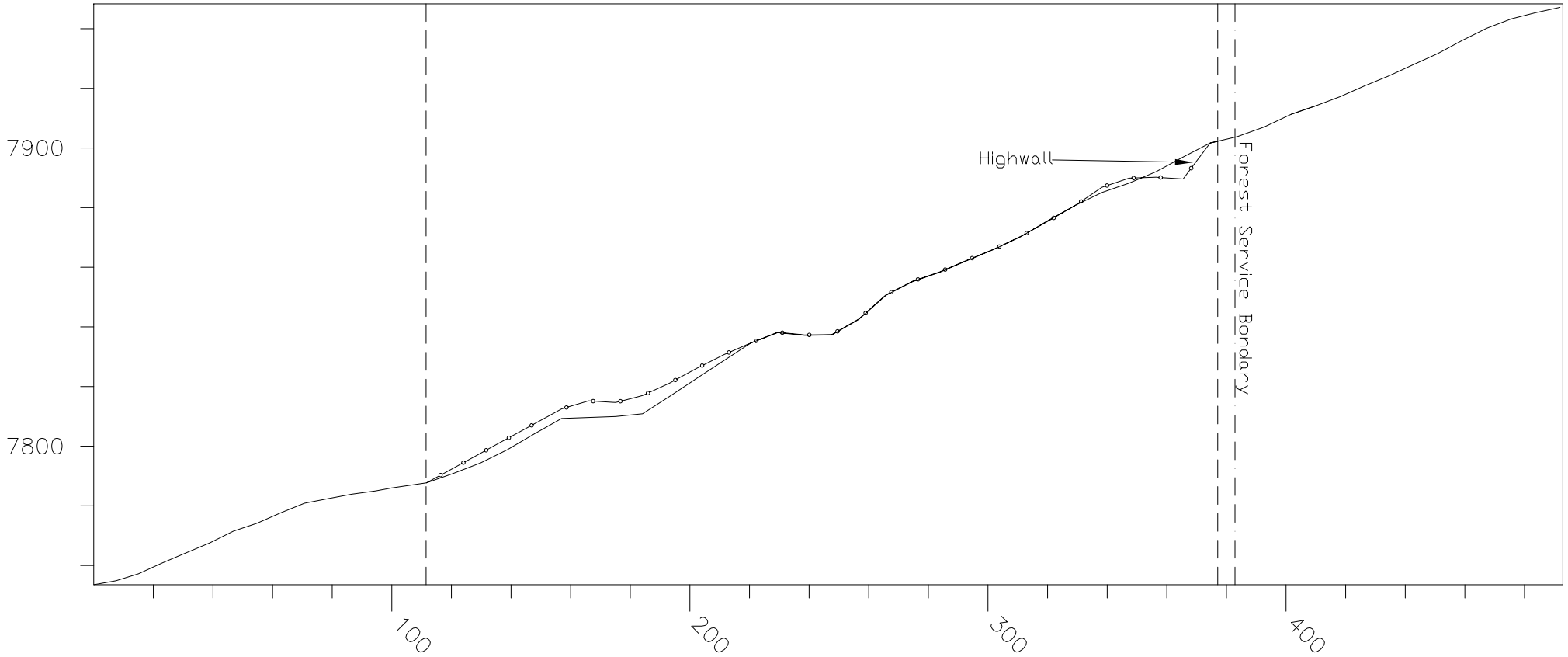
SURFACE FACILITIES

SCALE: 1" = 50'
DRAWN BY: M. Reynolds
DATE: 8/09/01

BEAR CANYON
WHR Tank Seam
Access Road

- Pre/Post Mining
- Operation
- Dst. Boundary
- Forest Service

TS-17 Section 1+00



CO-OP MINING CO.
HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:
1" = 55'

DRAWN BY:
M. Reynolds

DATE:
8/09/01

BEAR CANYON

WHR Tank Seam
Access Road

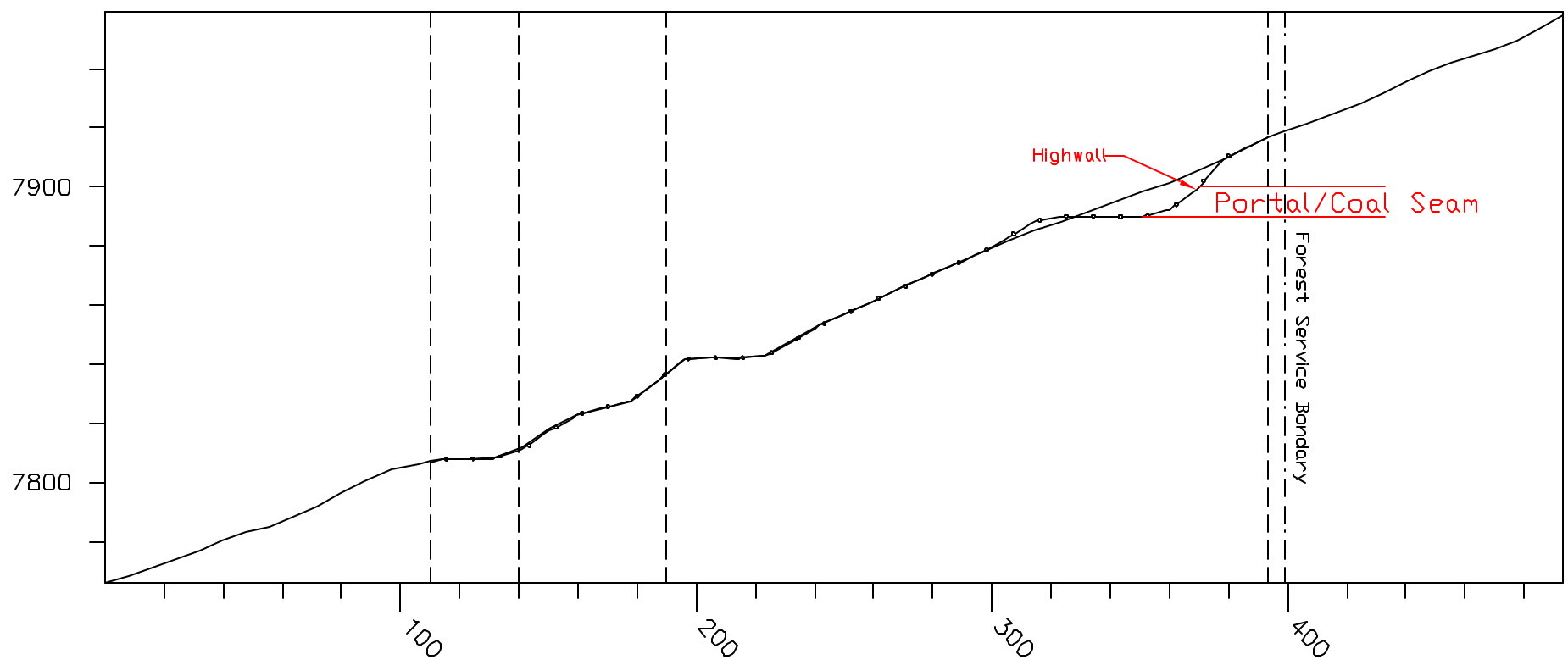
Pre/Post Mining

Operation

Dst. Boundary

Forest Service

TS-17 Section 1+50



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

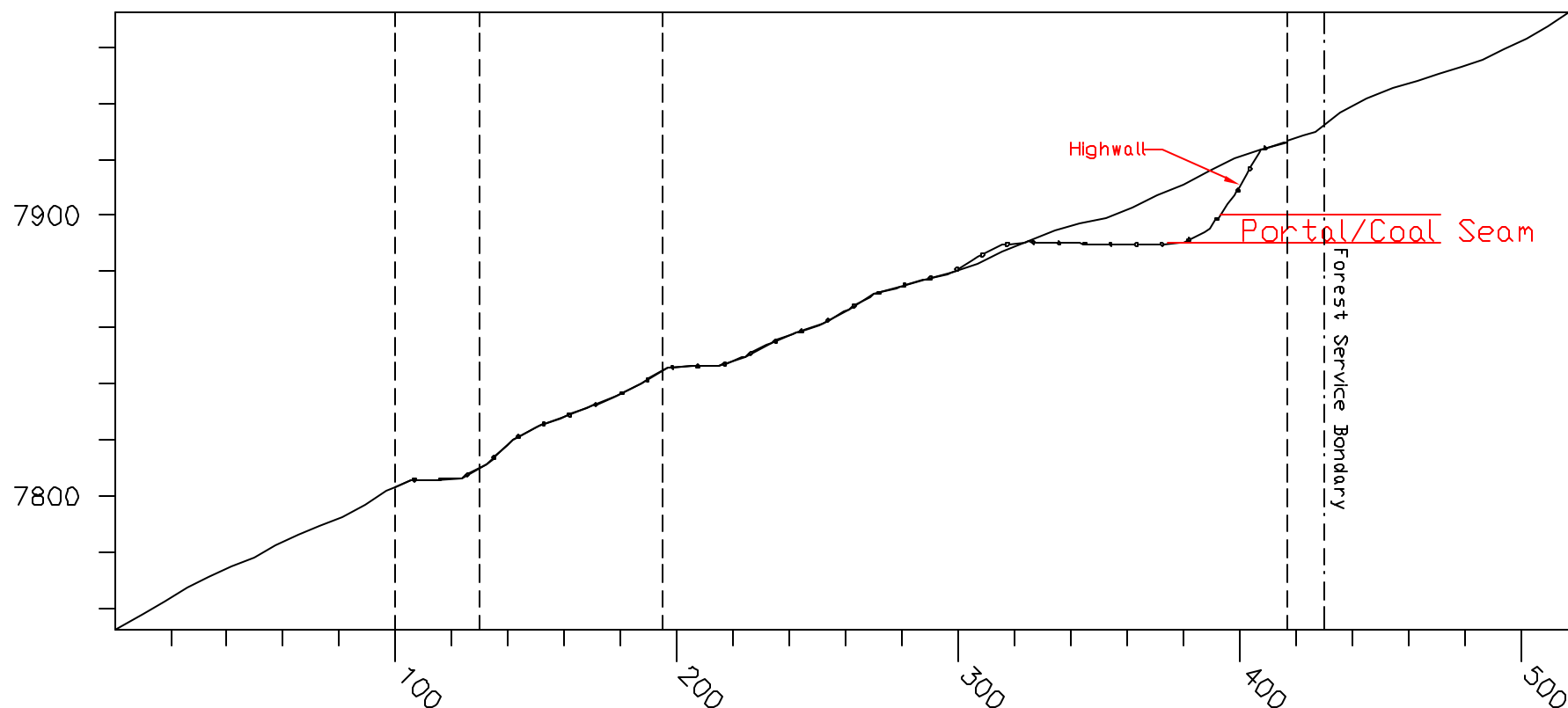
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DRAWN BY: M. Reynolds
DATE: 8/09/01

BEAR CANYON

WHR Tank Seam
Access Road

Pre/Post Mining —————
Operation —●—●—●—●—●—●—●—
Dst. Boundary - - - - -
Forest Service - · - - - -

TS 17 Section 2+00



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:

1" = 60'

DRAWN BY:

M. Reynolds

DATE:

8/09/01

BEAR CANYON

WHR Tank Seam
Access Road

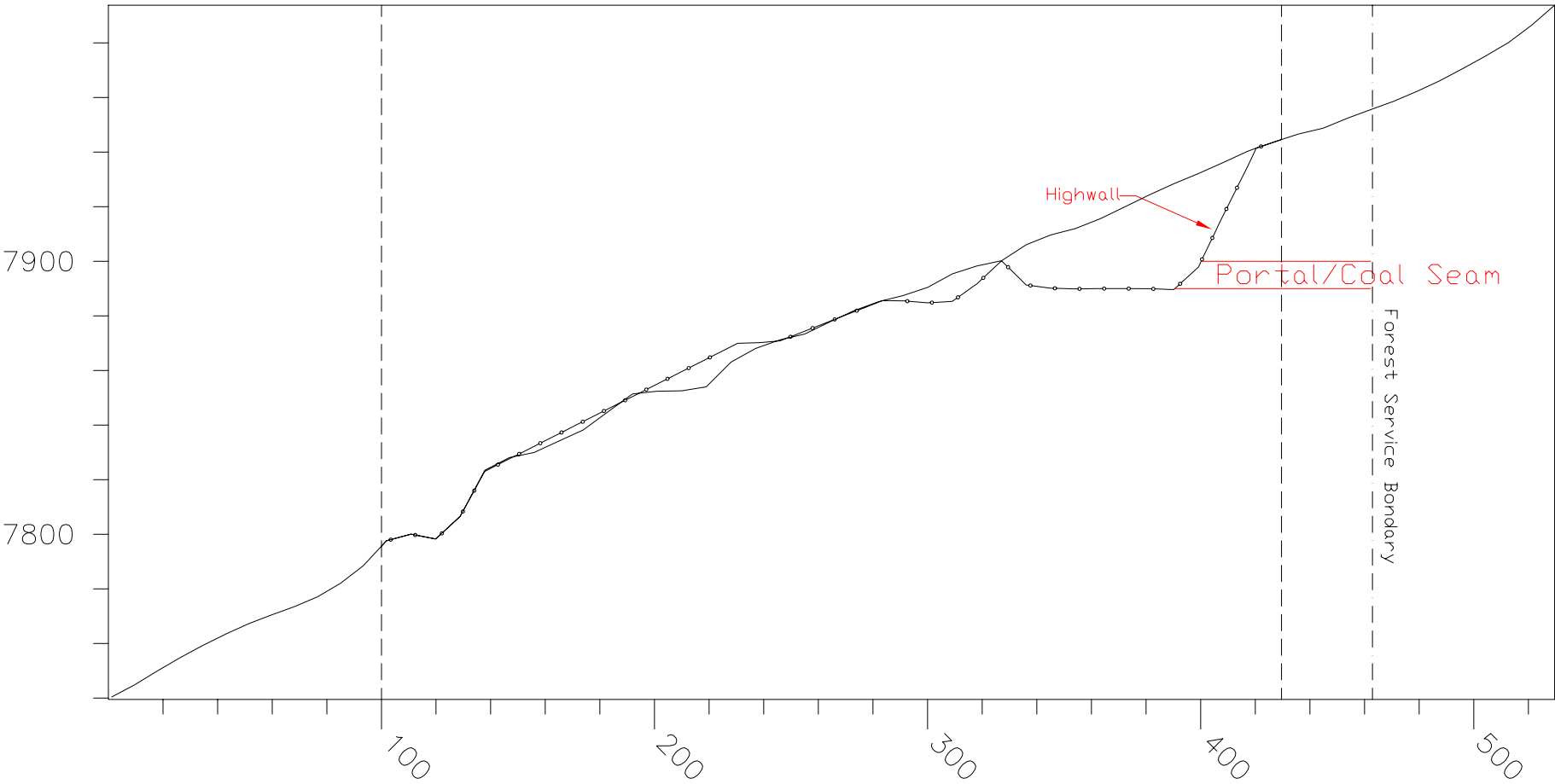
Pre/Post Mining

Operation

Dst. Boundary

Forest Service

TS-17 Section 2+50



CO-OP MINING CO.
HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:
1" = 70'

DRAWN BY:
M. Reynolds

DATE:
8/09/01

BEAR CANYON

WHR Tank Seam
Access Road

Pre/Post Mining

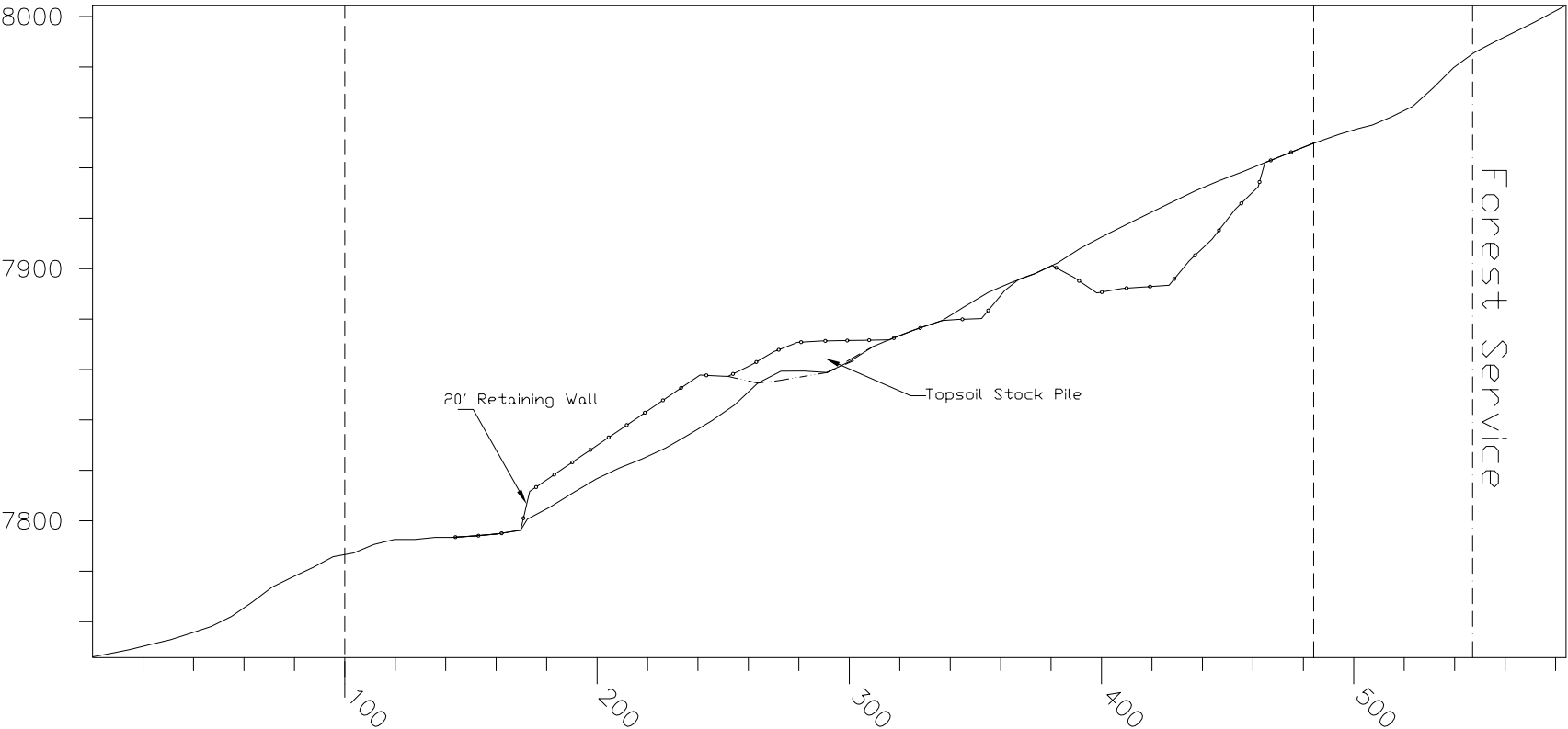
Operation

Dst. Boundary

Forest Service

Topsoil

TS-17 Section 3+00



CO-OP MINING CO.

HUNTINGTON, UTAH

SURFACE FACILITIES

SCALE:

$$1'' = 45'$$

DRAWN BY:

M. Reynolds


DATE:

8/09/01

BEAR CANYON

WHR Tank Seam
Access Road

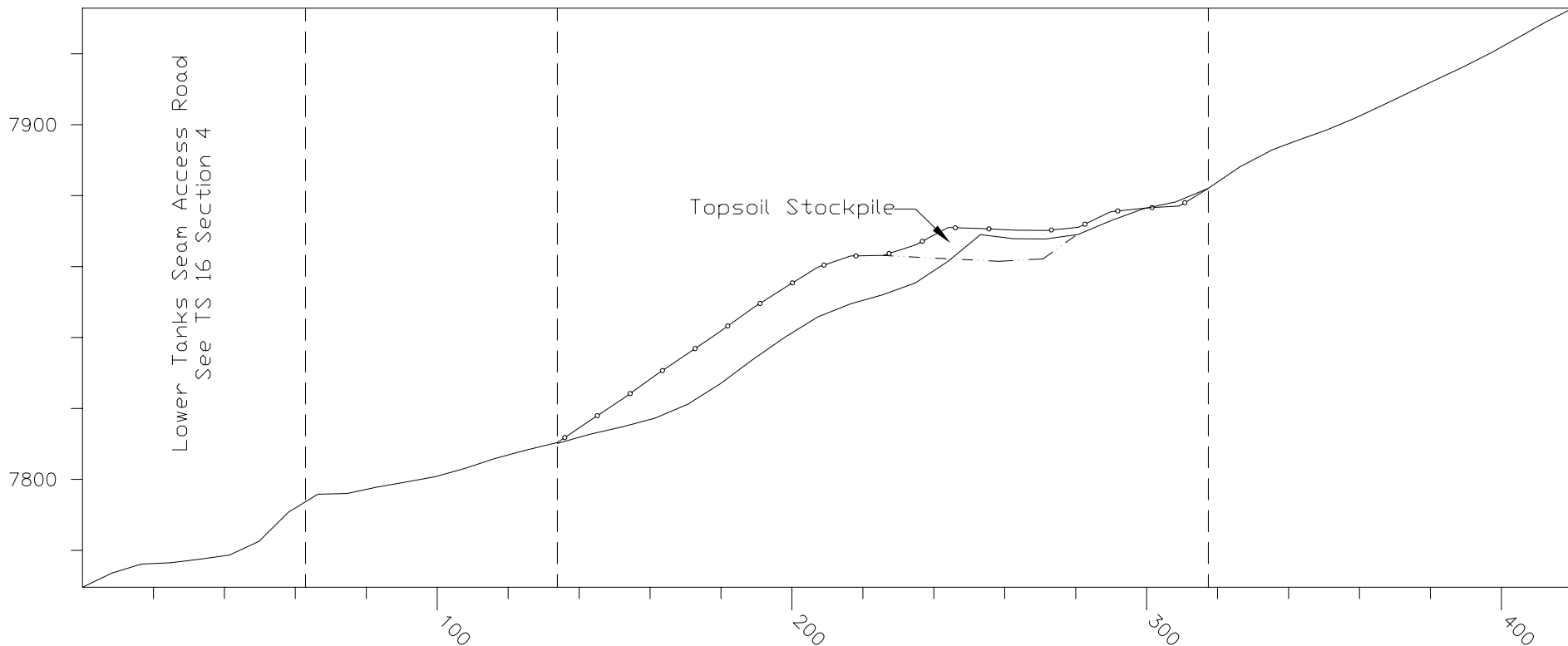
Pre/Post Mining _____

Operation 

Dst. Boundary -----

Topsoil — — — — —

TS 17 Section 3+50



Attachment B

Slope Stability Analysis for the Wild Horse

Ridge Tank Seam Portal Site



CO-OP Mining Company
P. O. Box 1245
Huntington Canyon
Huntington, Utah 84528

Attention: Mr. Charles Reynolds

RE: Slope Stability Evaluation
Tank Seam Access Road
Bear Canyon

Dear Mr. Reynolds:

INTRODUCTION

This letter presents the results of the slope stability analyses conducted for the proposed access road for the WHR Tank Seam Portal Site. The site work includes a cut into the bedrock, fill over existing native granular colluvium, and topsoil stockpiling. The analyses were conducted on five of the sections given to URS by CO-OP Mining Company. The analyses included both static and dynamic slope stability analysis of the site.

ASSUMPTIONS

The soil properties in the area were given in an earlier report dated October 7, 1996. The properties used in the analyses to model the soil and rock are presented in the following table:

Soil/Bedrock Type	Total Unit Weight (pcf)	Saturated Unit Weight (pcf)	Cohesion (psf)	Angle of Internal Friction (degrees)
Compacted Fill	125	130	0	36
Native Granular Colluvium	115	120	0	34
Topsoil*	105	110	0	25
Native Sandstone	130	135	3,600	43

* Topsoil values assumed for the analyses.

It was assumed that 10 feet of colluvium covers the native Sandstone. This assumption was based upon the report mentioned above. The dynamic stability used a 0.10g factor for the seismic loading. This is a probabilistic peak acceleration with a 10% chance of being exceeded in 50 years.

ANALYSIS

The five selected sections for analysis are 0+00, 0+50, 2+50, 3+00, and 3+50. The slope stability analyses were performed using GEO-SLOPE, Version 4.21. The analyses included circular failure surfaces to determine the factor of safety against slope failure. The method used for the analyses was the Spencer method in addition to Bishop, Ordinary and Janbu methods. The analyses used 30 cross sections for each section studied. Different portions of two of the selected sections, sections 2+50 and 3+00, were analyzed for stability. The resulting sections and failure slopes of the analyses are attached at the end of this report.

RESULTS

The minimum factor of safety for the static loads of any slope is 1.3 for compacted fill or cut slopes. The minimum factor of safety for excess spoil used on site is 1.5 for static loads. The minimum factor of safety for dynamic loads is 1.1. The resulting minimum factor of safety for any of the analyses was 1.30 for non-spoil static loads and 1.09 for the dynamic loads. The resulting minimum factors of safety for each of the analyses are given in the following table:

SECTION	TYPE ANALYZED	STATIC	DYNAMIC
0+00	FILL	1.41	1.14
0+50	FILL	1.33	1.09
2+50	EXISTING 2:1 SLOPE	1.30	1.09
2+50 A	UPPER CUT	1.45	1.16
2+50 B	LOWER CUT	1.80	1.38
2+50 C	FILL	1.97	1.50
3+00	FILL	1.39	1.13
3+00 A	UPPER CUT	1.35	1.10
3+00 B	LOWER CUT	1.60	1.25
3+00 C	TOP SOIL	2.68	1.84
3+50	FILL	1.59	1.29

The resulting minimum factors of safety for the sections of the analyses showing the reclaimed areas are given in the following table:

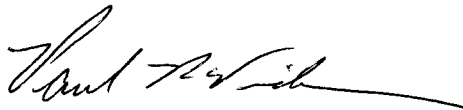
SECTION	TYPE ANALYZED	STATIC	DYNAMIC
2+50	UPPER CUT RECLAIMED	2.18	1.74
2+50	LOWER CUT RECLAIMED	2.41	1.83
3+00	UPPER CUT RECLAIMED	2.24	1.97
3+00	LOWER CUT RECLAIMED	1.51	1.22

CONCLUSION

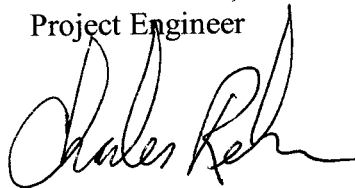
As can be seen by the table, the resulting factors of safety are at or above the minimum guideline factors of safety. The only section that is at the minimum in both factors of safety is Section 2+50 in the existing 2:1 slope at the lower end of the section. Stabilization of the slope would add to the factor of safety in that area. All other sections showed that the WHR Tank Seam Access Road could be safely built in the area designated.

We appreciate the opportunity we have had to provide this service for you. If you have any questions, comments, or concerns with the analysis done, please feel free to call us.

Respectfully Submitted,
URS Corp.



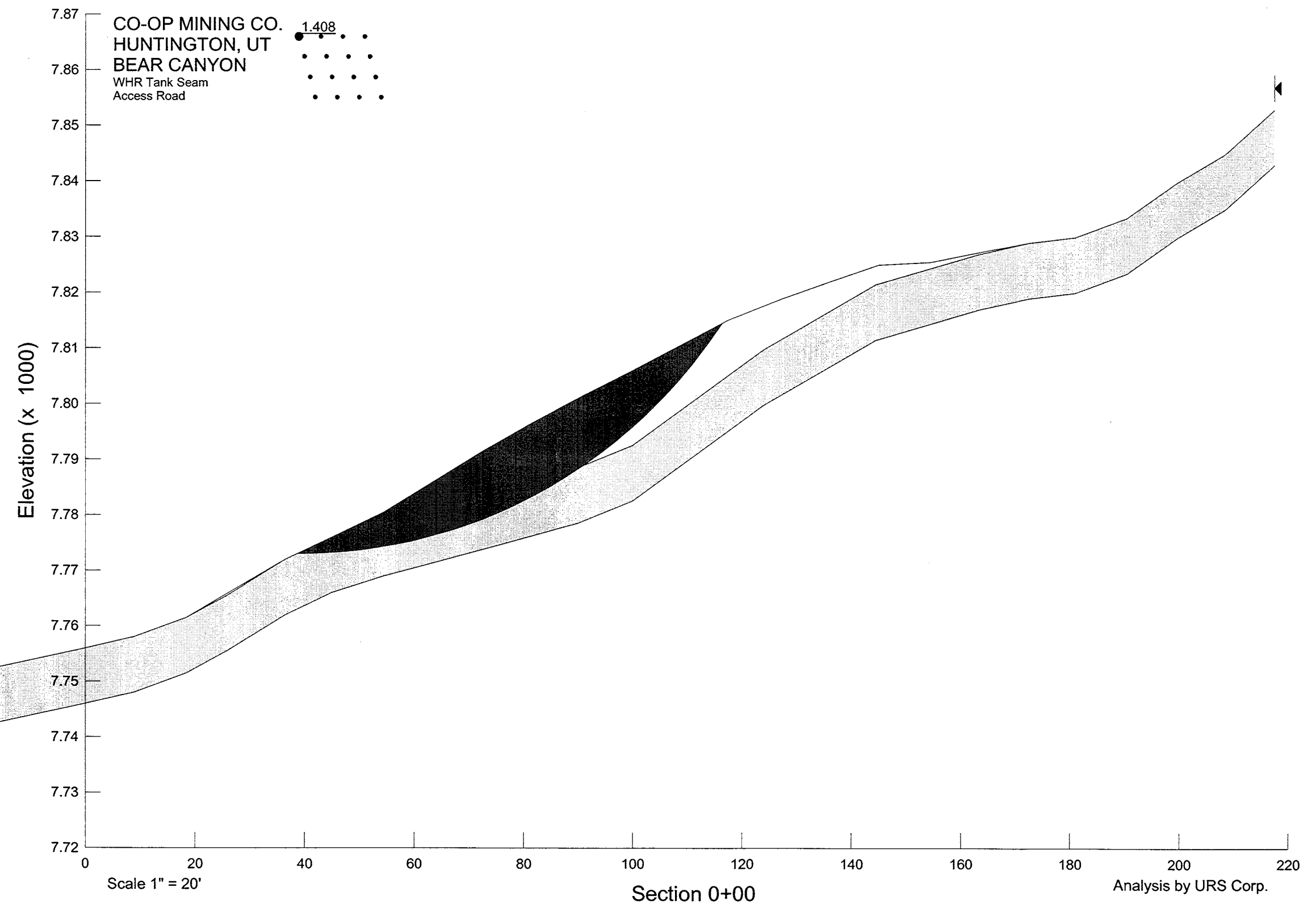
Paul R. Vidmar, P.E.
Project Engineer

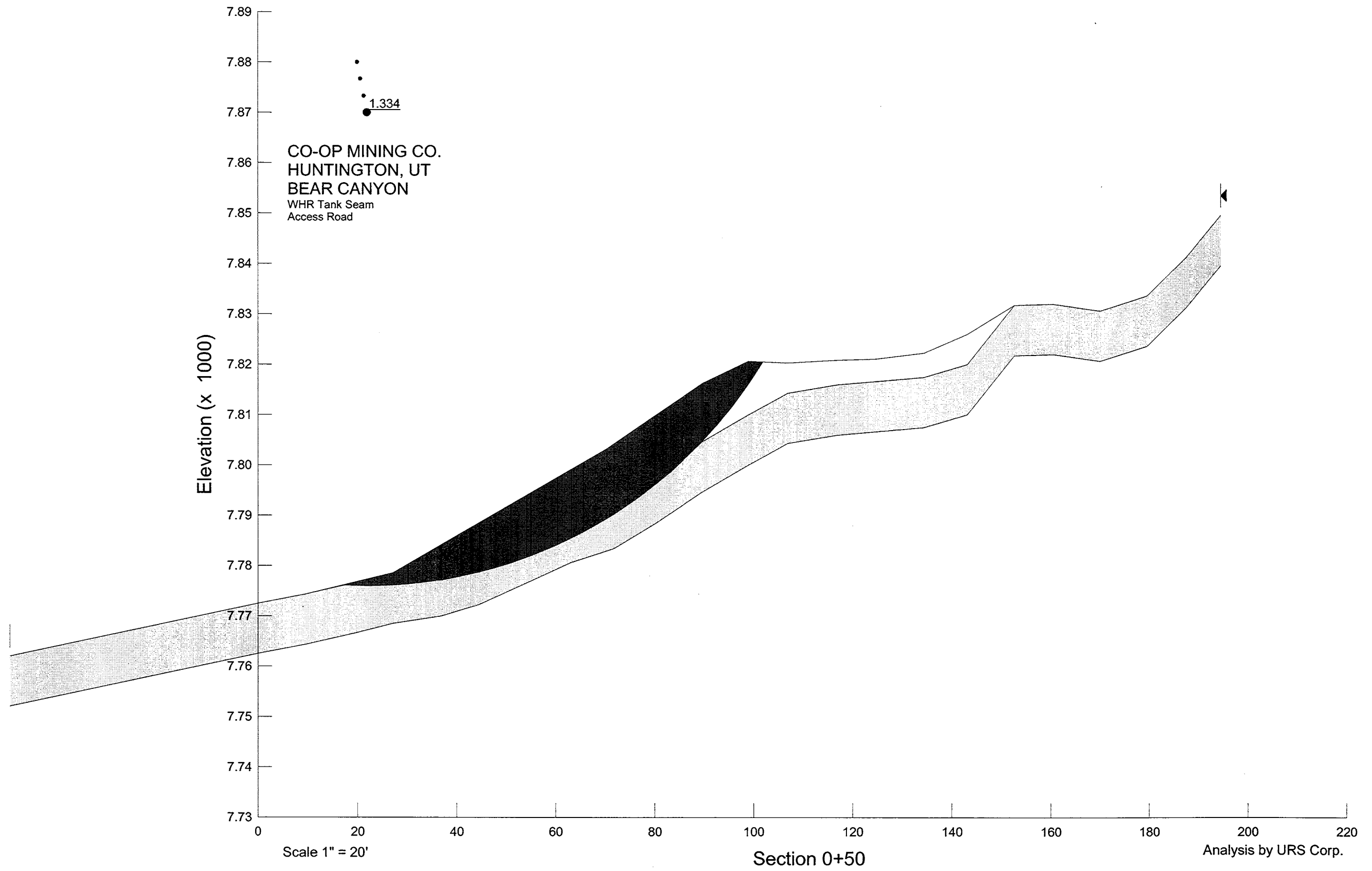


Charles C. Rehn, P.E.
Project Manager

APPENDIX A

CROSS SECTIONS OF STATIC ANALYSES





CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road

Elevation (x 1000)

8.00
7.98
7.96
7.94
7.92
7.90
7.88
7.86
7.84
7.82
7.80
7.78
7.76

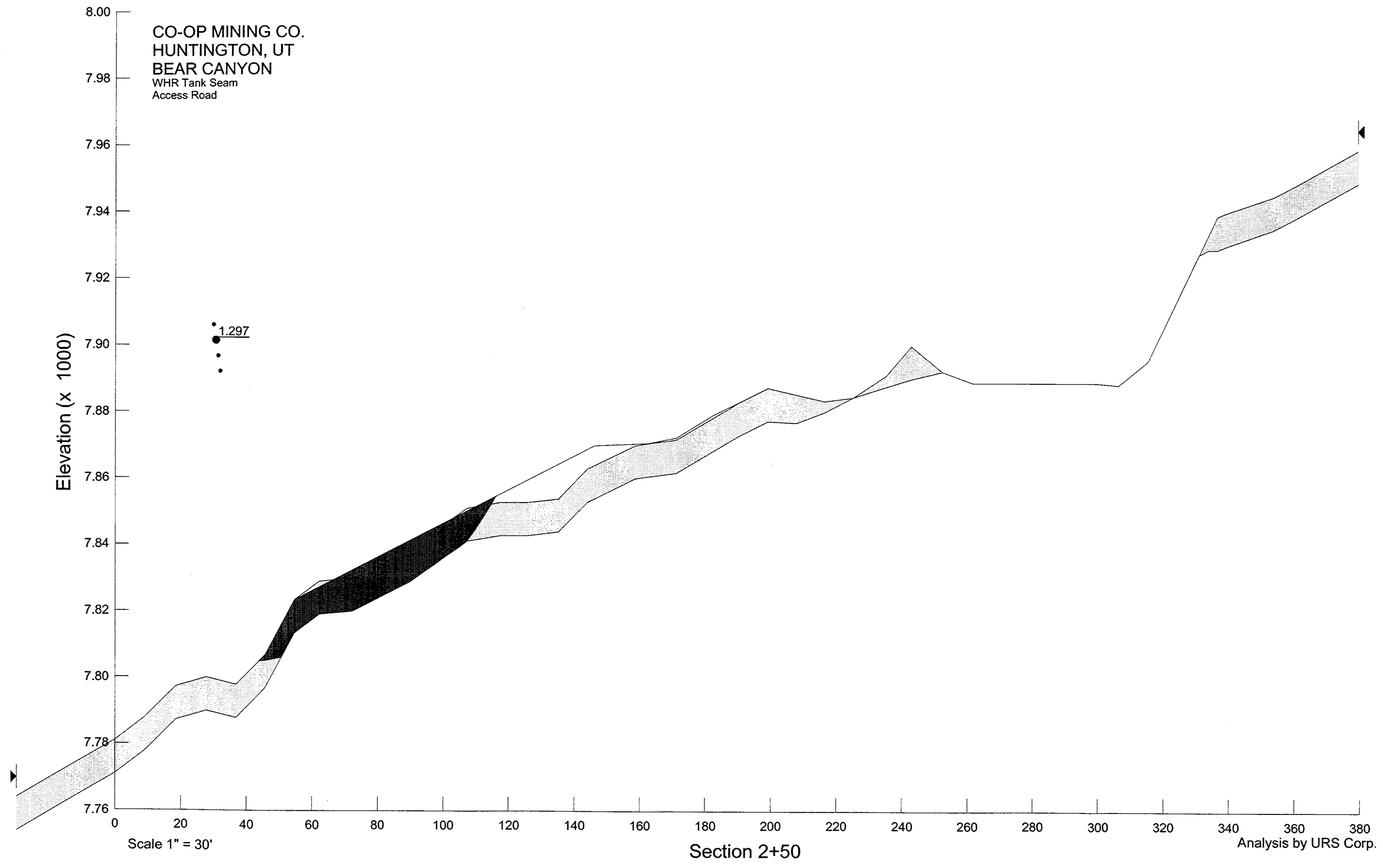
1.297

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380

Scale 1" = 30'

Section 2+50

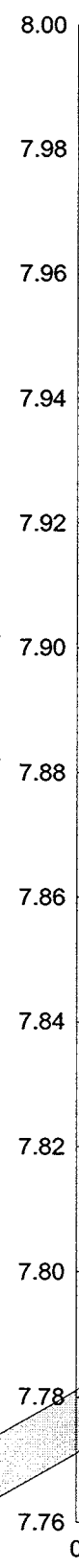
Analysis by URS Corp.



CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road

1.447

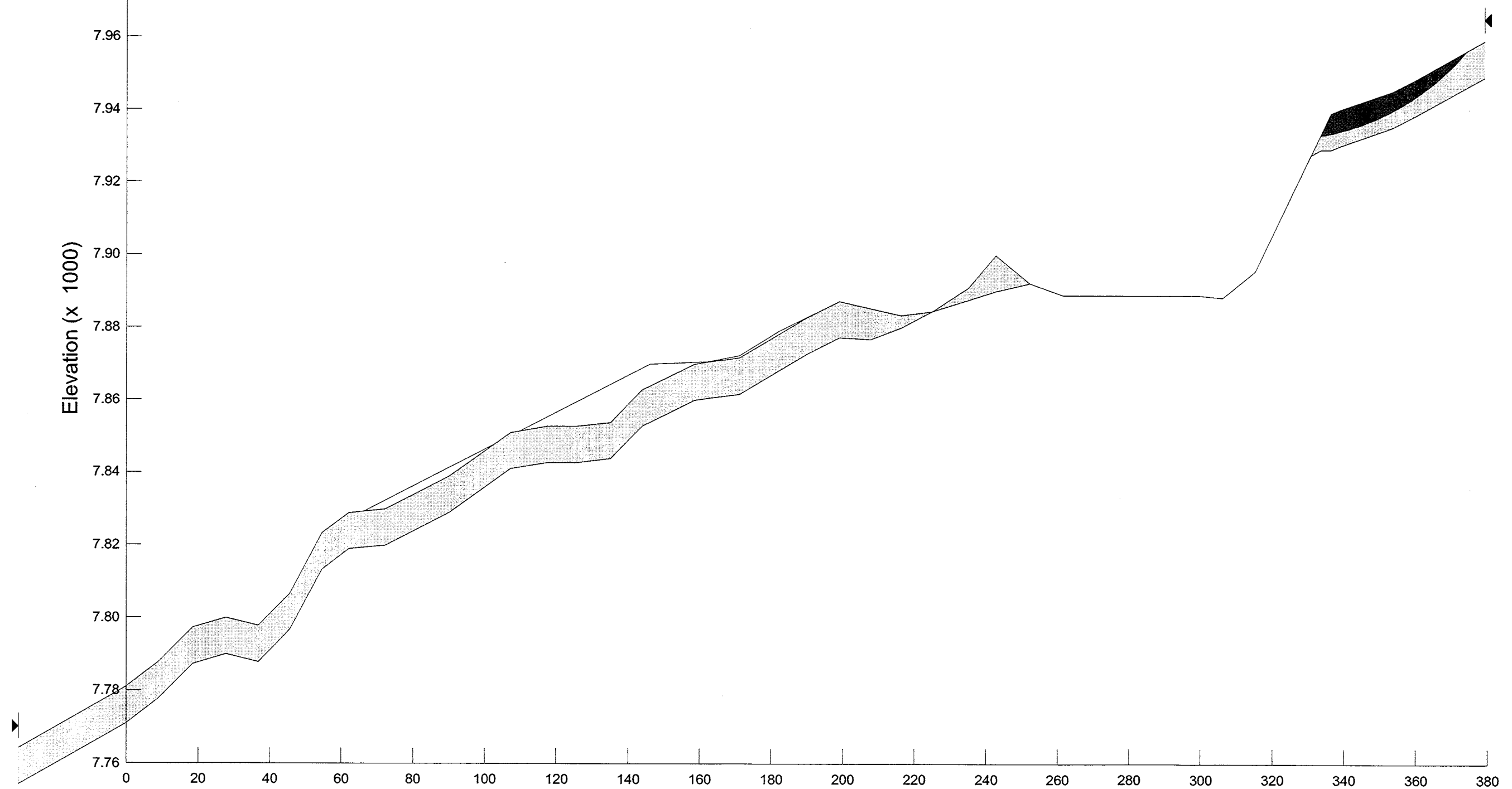
Elevation (x 1000)



Scale 1" = 30'

Section 2+50 A

Analysis by URS Corp.



CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road

Elevation (x 1000)

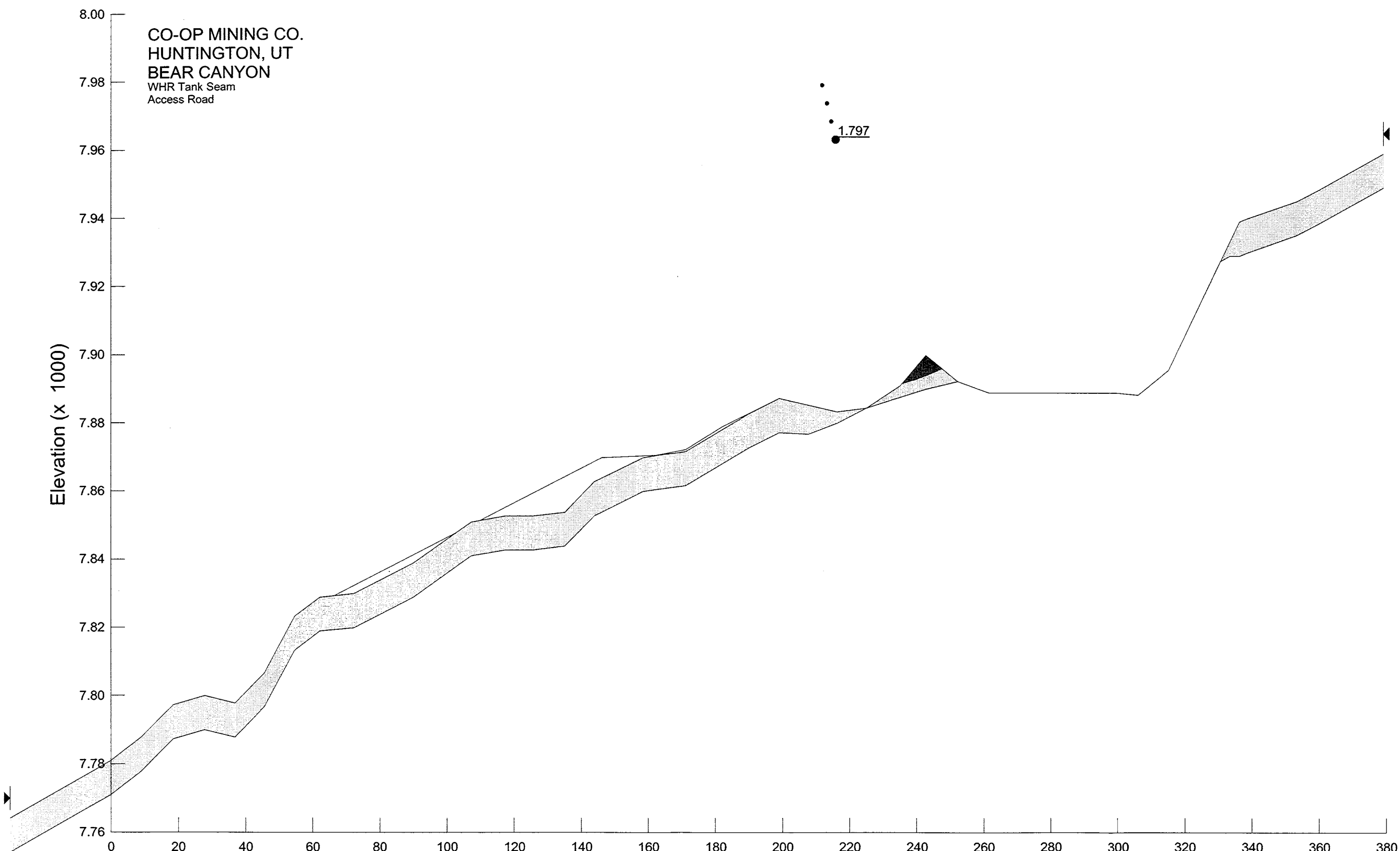
8.00
7.98
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7.94
7.92
7.90
7.88
7.86
7.84
7.82
7.80
7.78
7.76

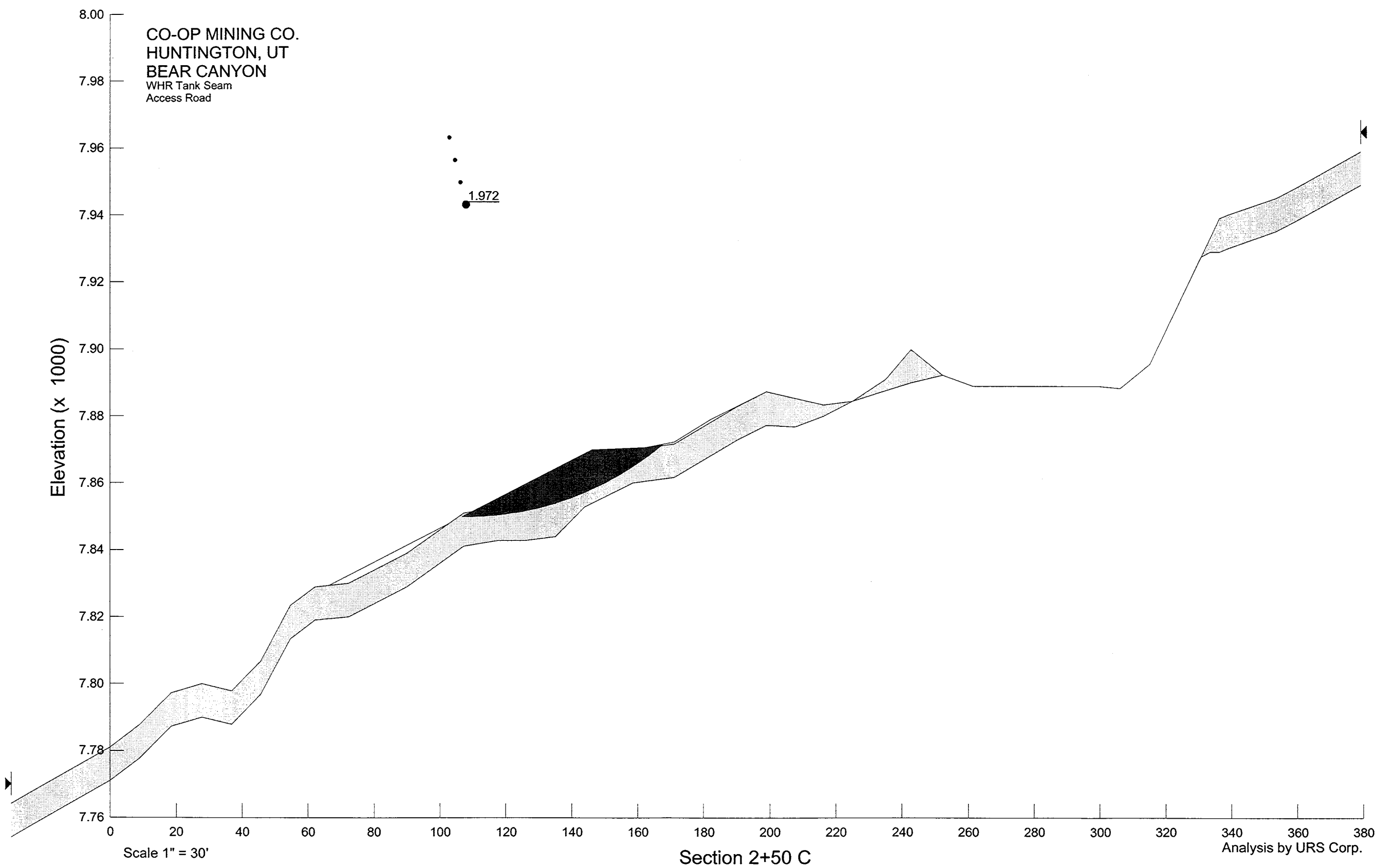
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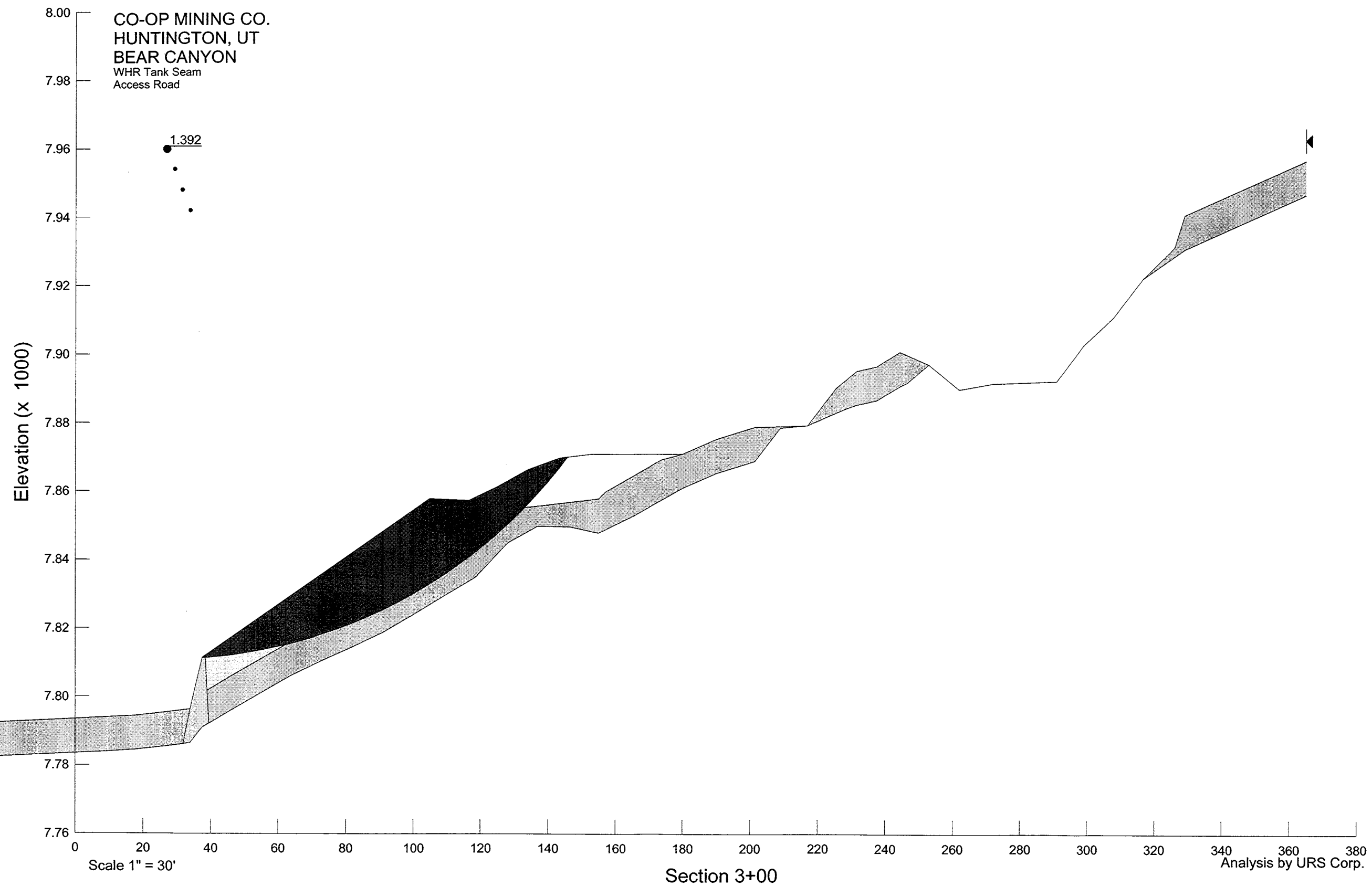
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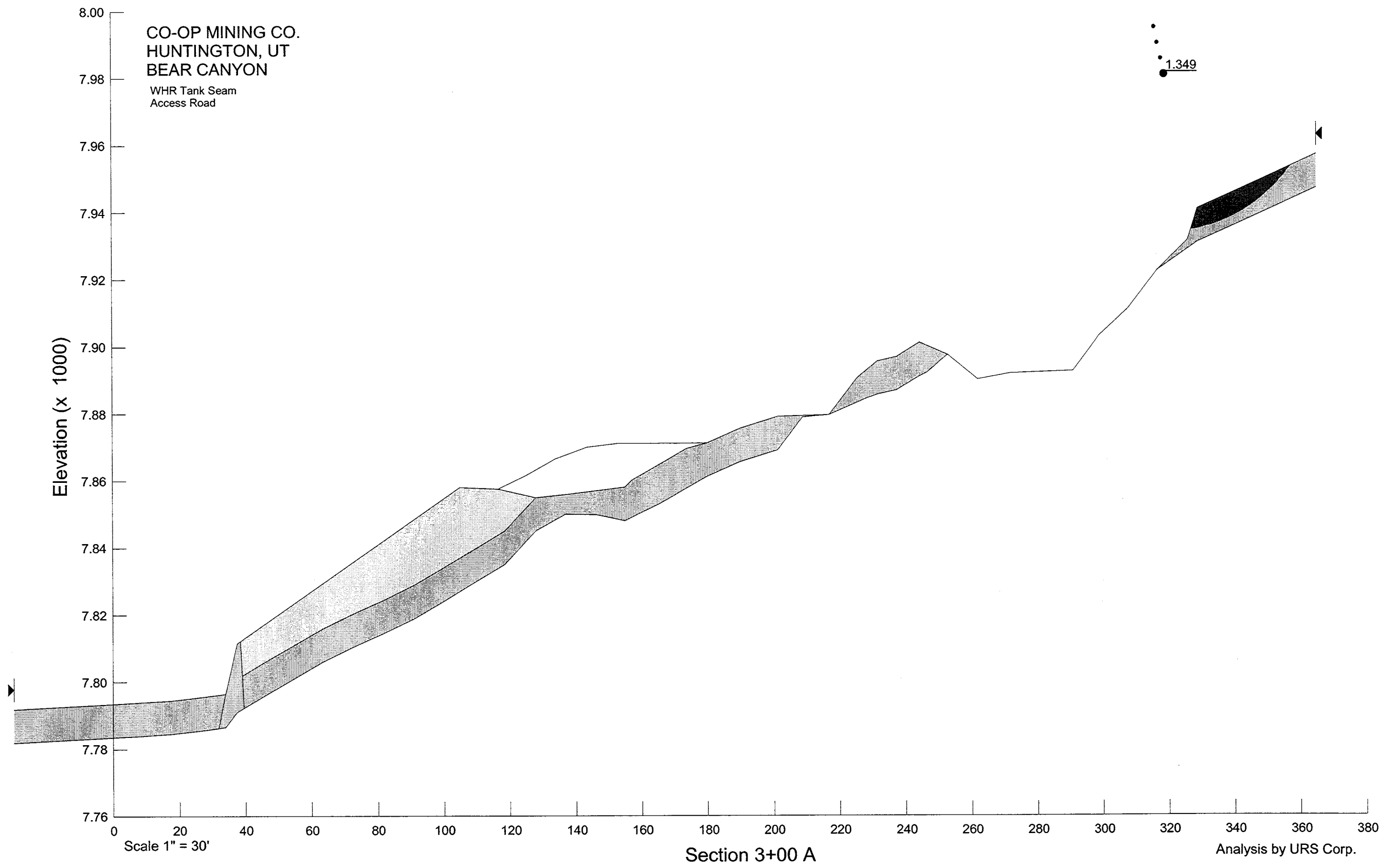
Analysis by URS Corp.

1.797



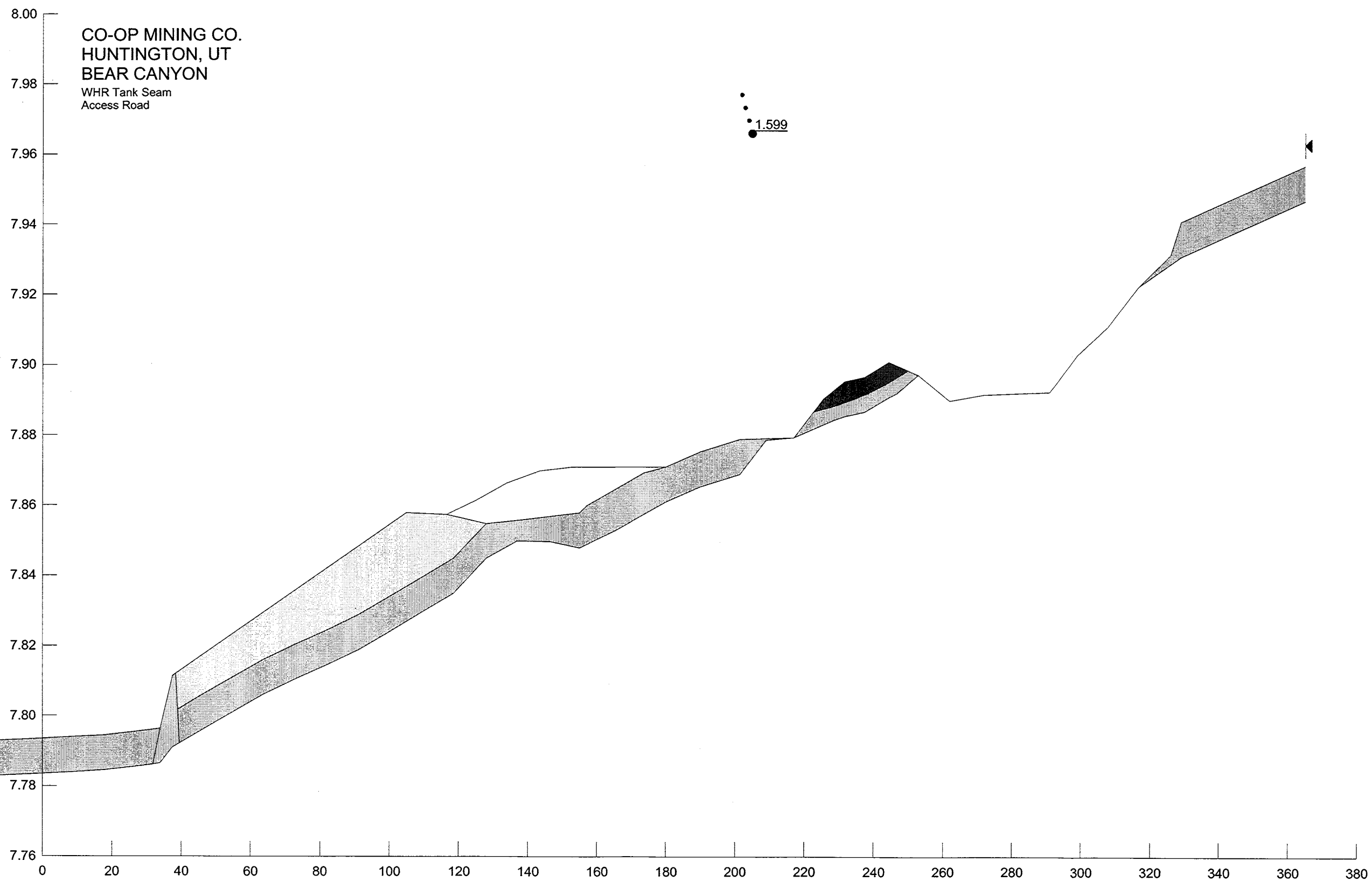






CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road

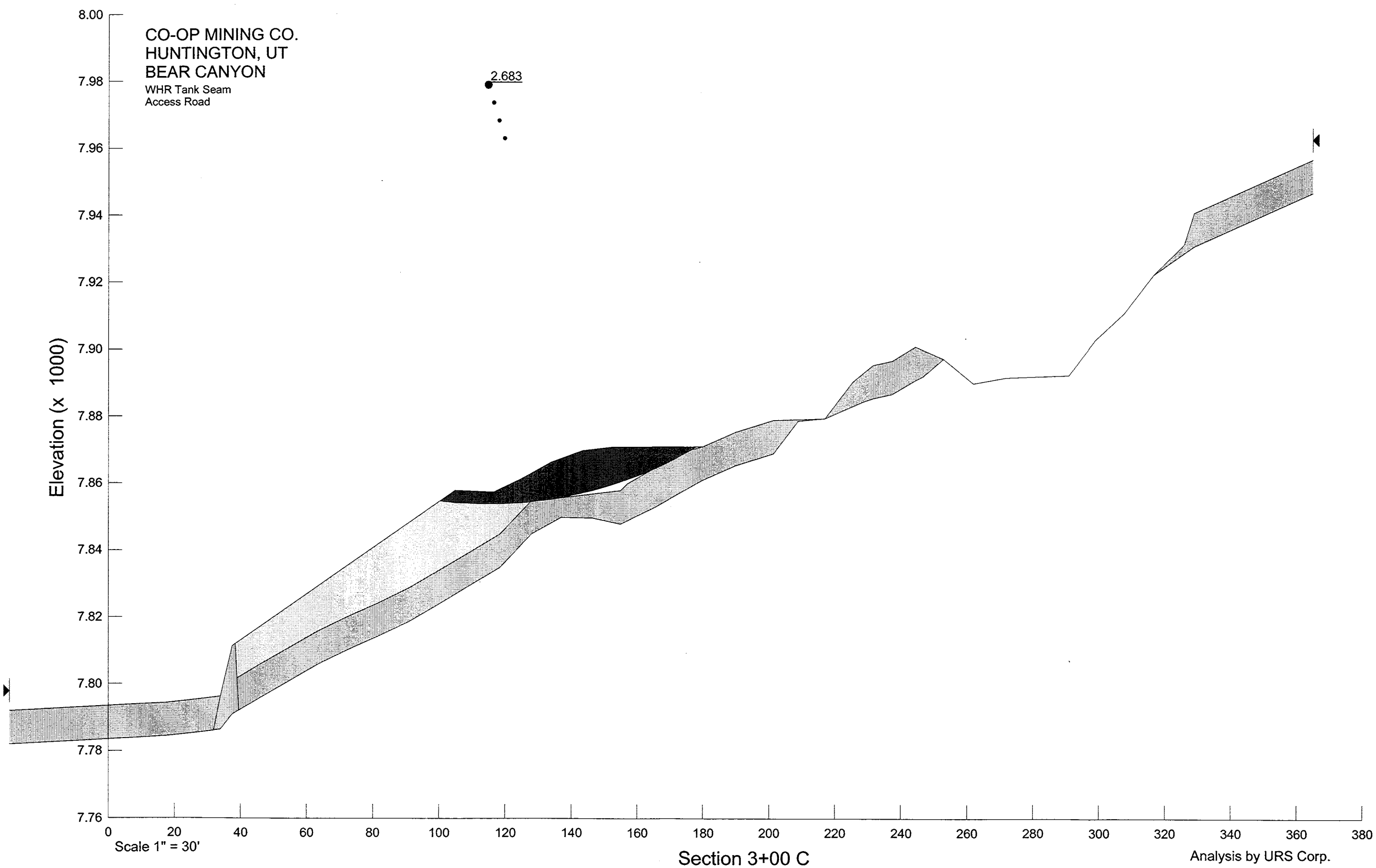
Elevation (x 1000)

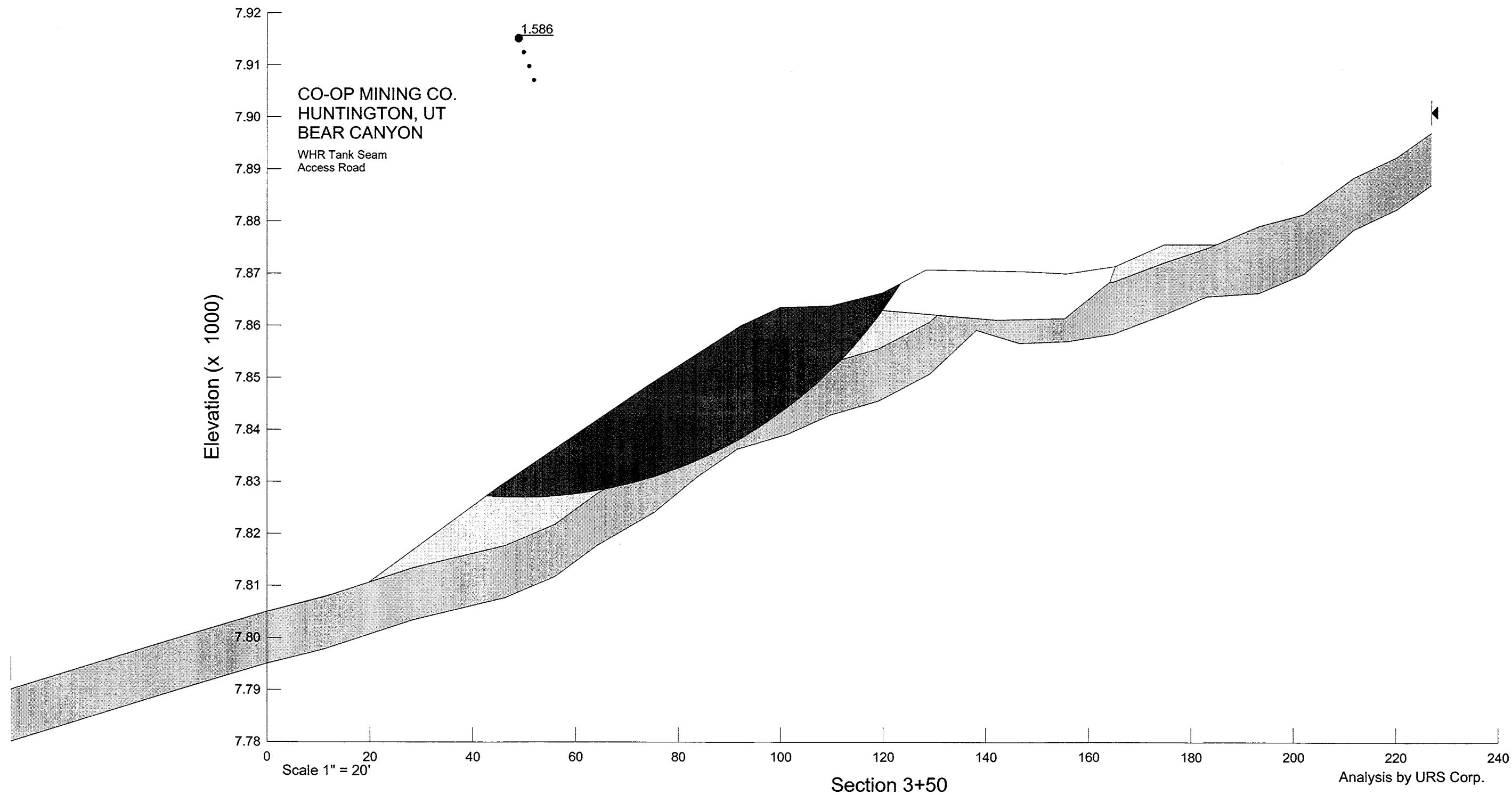


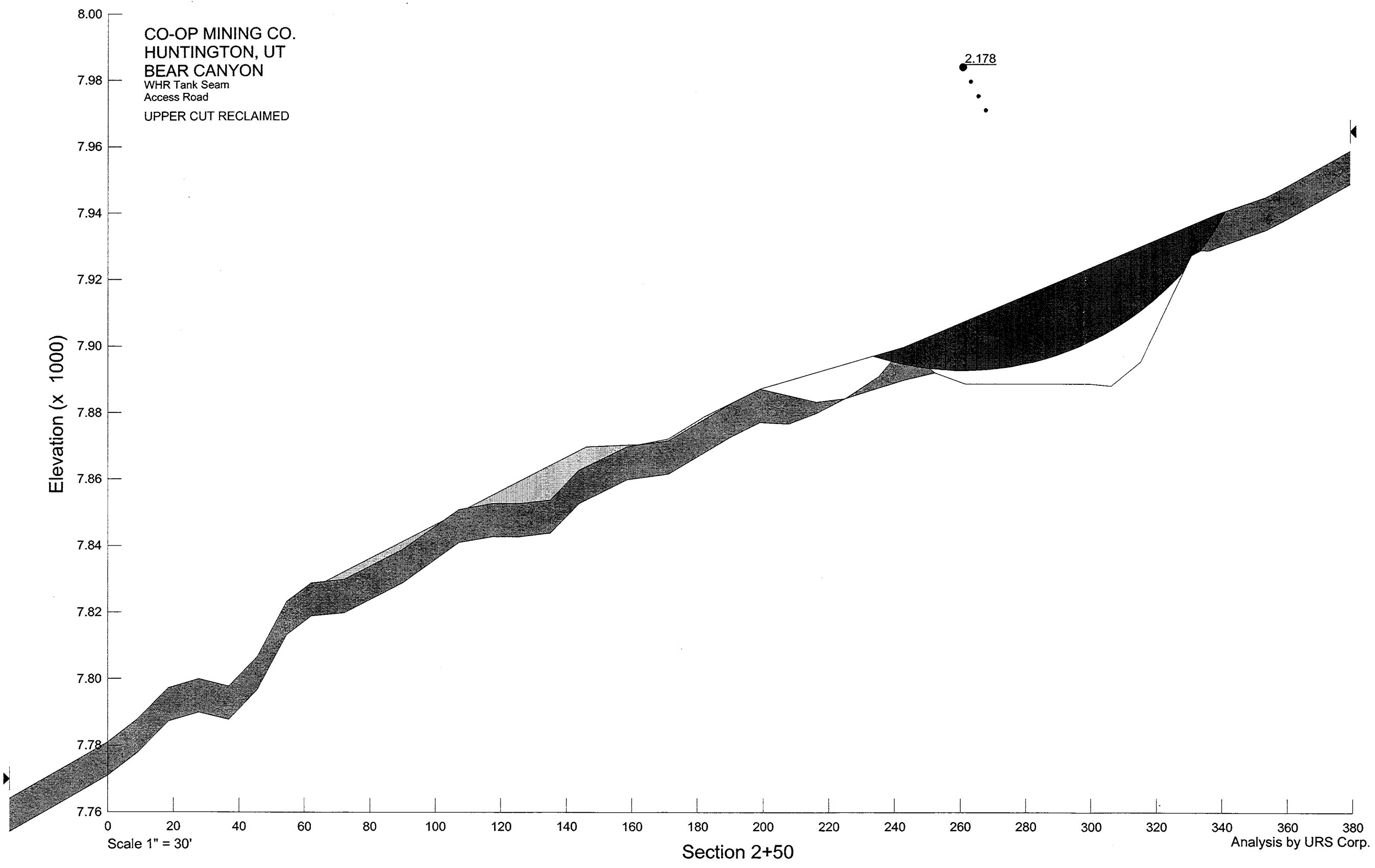
Scale 1" = 30'

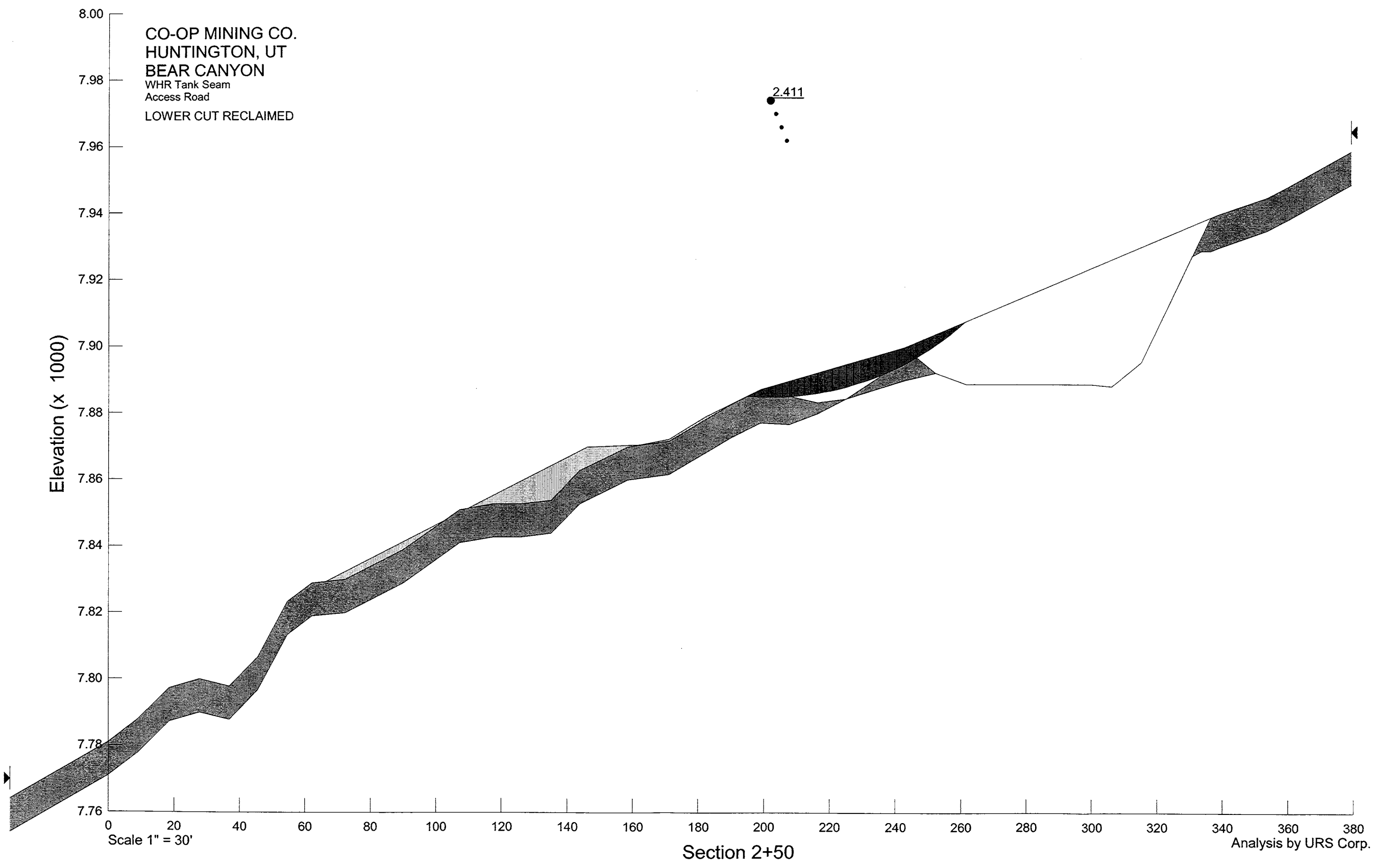
Section 3+00 B

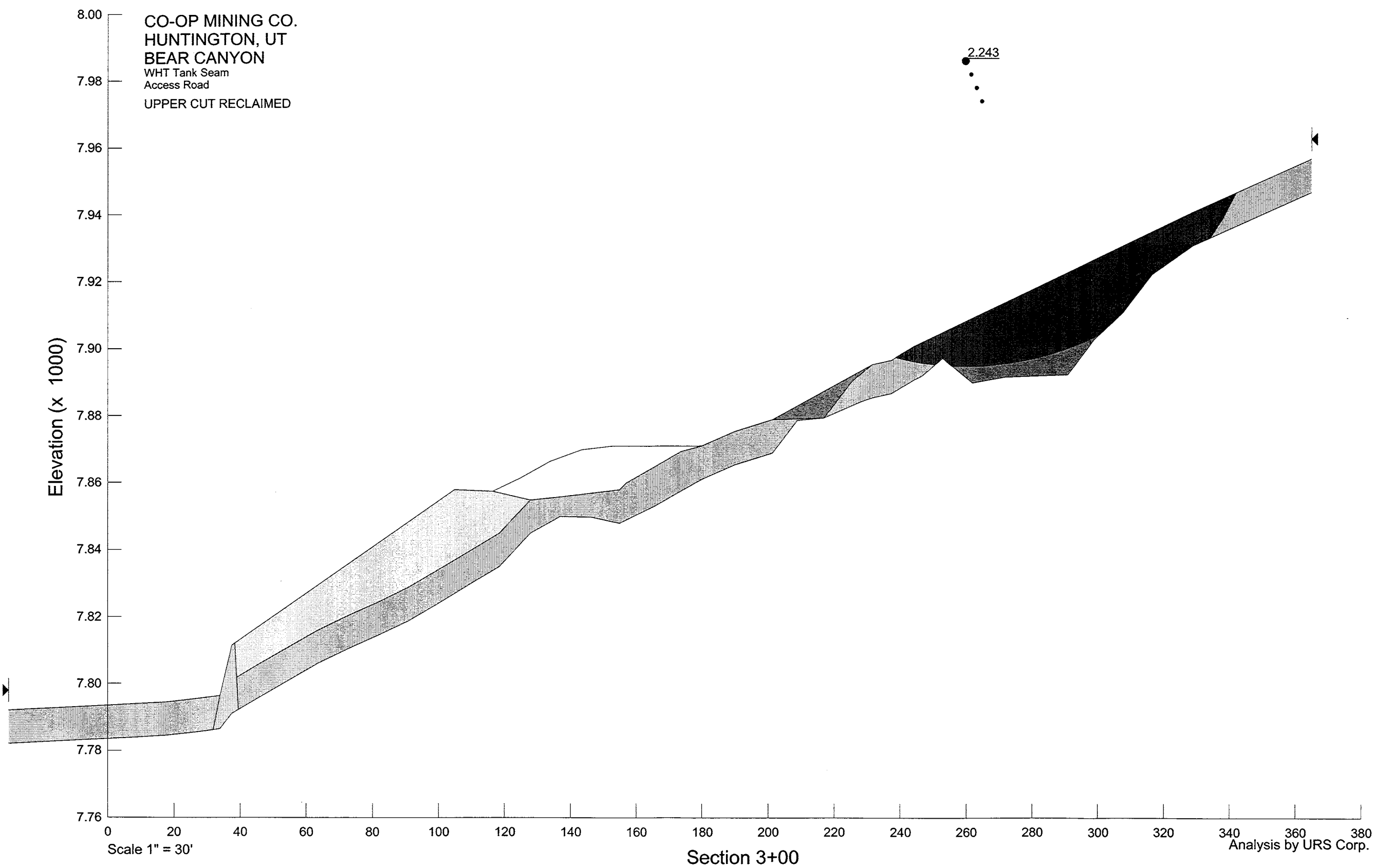
Analysis by URS Corp.

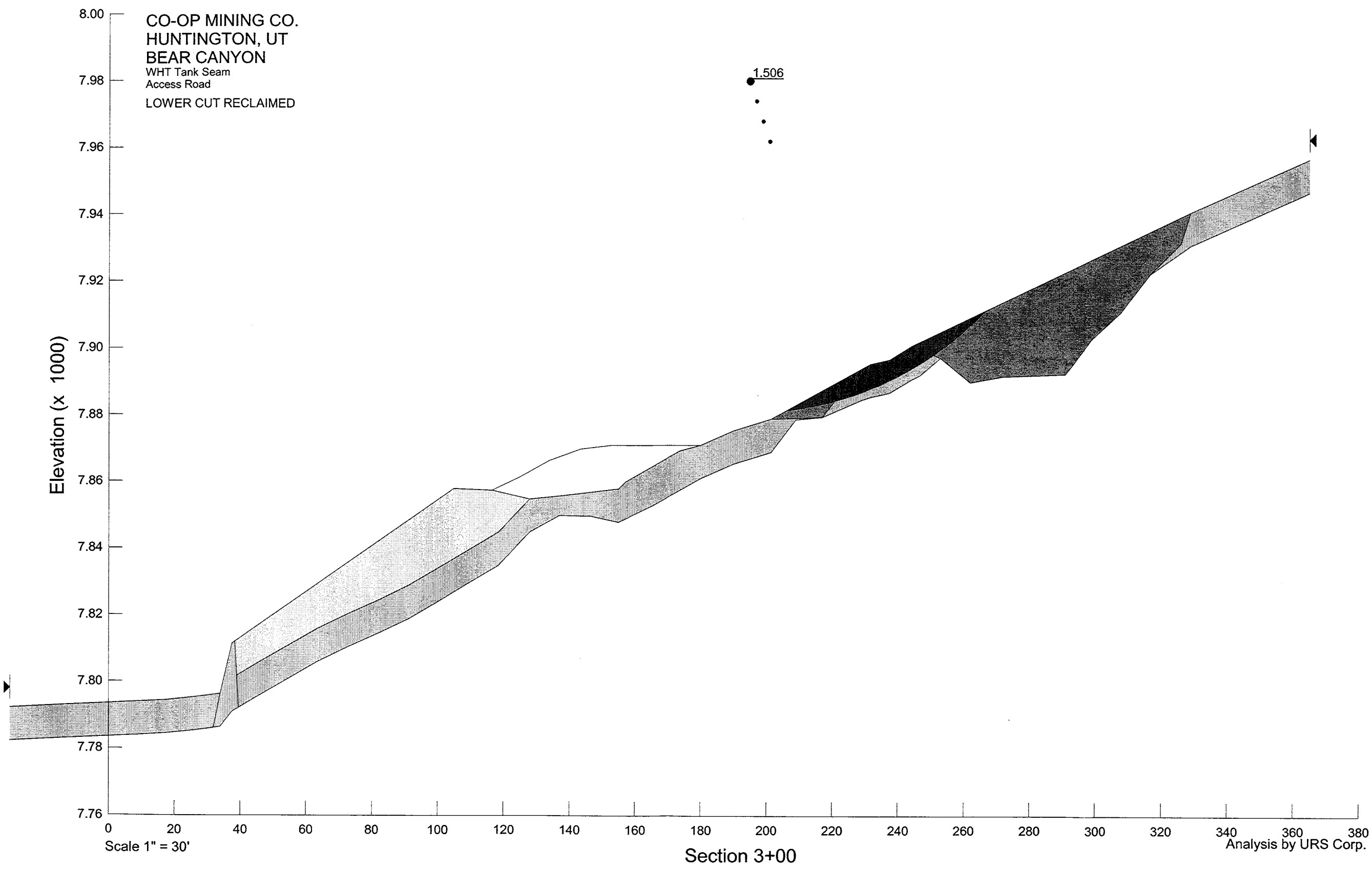








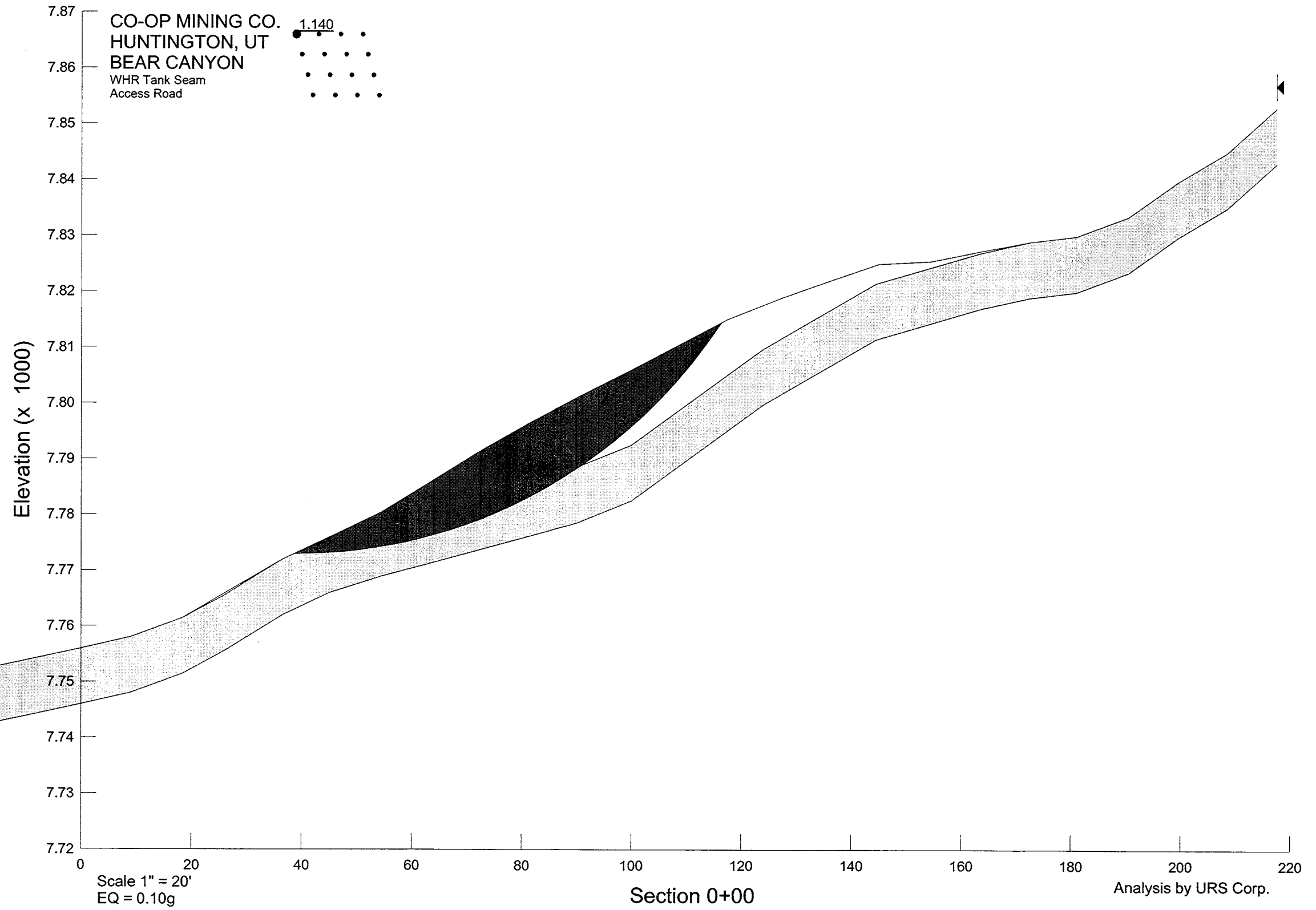
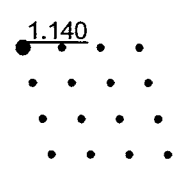


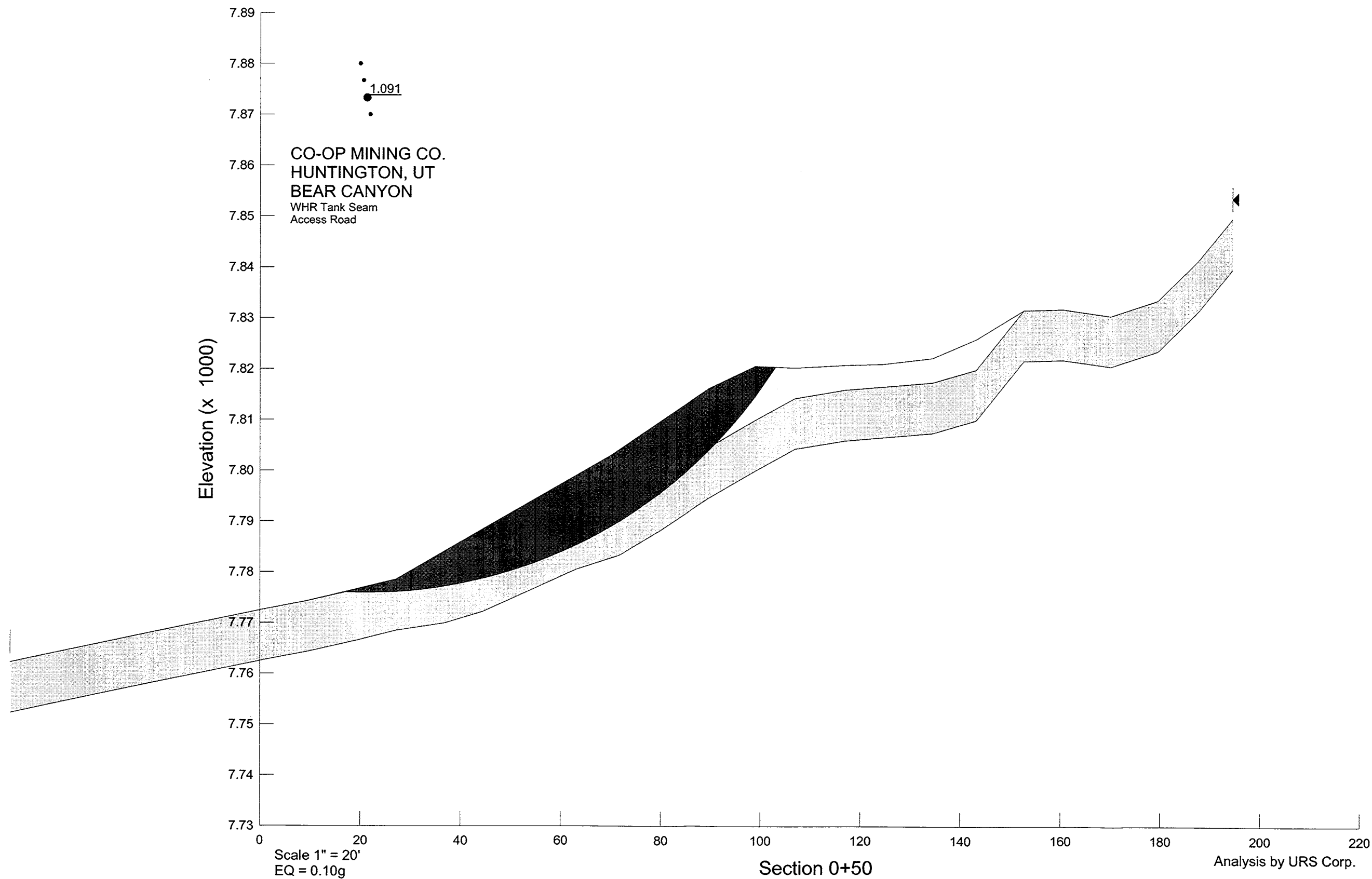


APPENDIX B

CROSS SECTIONS OF DYNAMIC ANALYSES

CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road



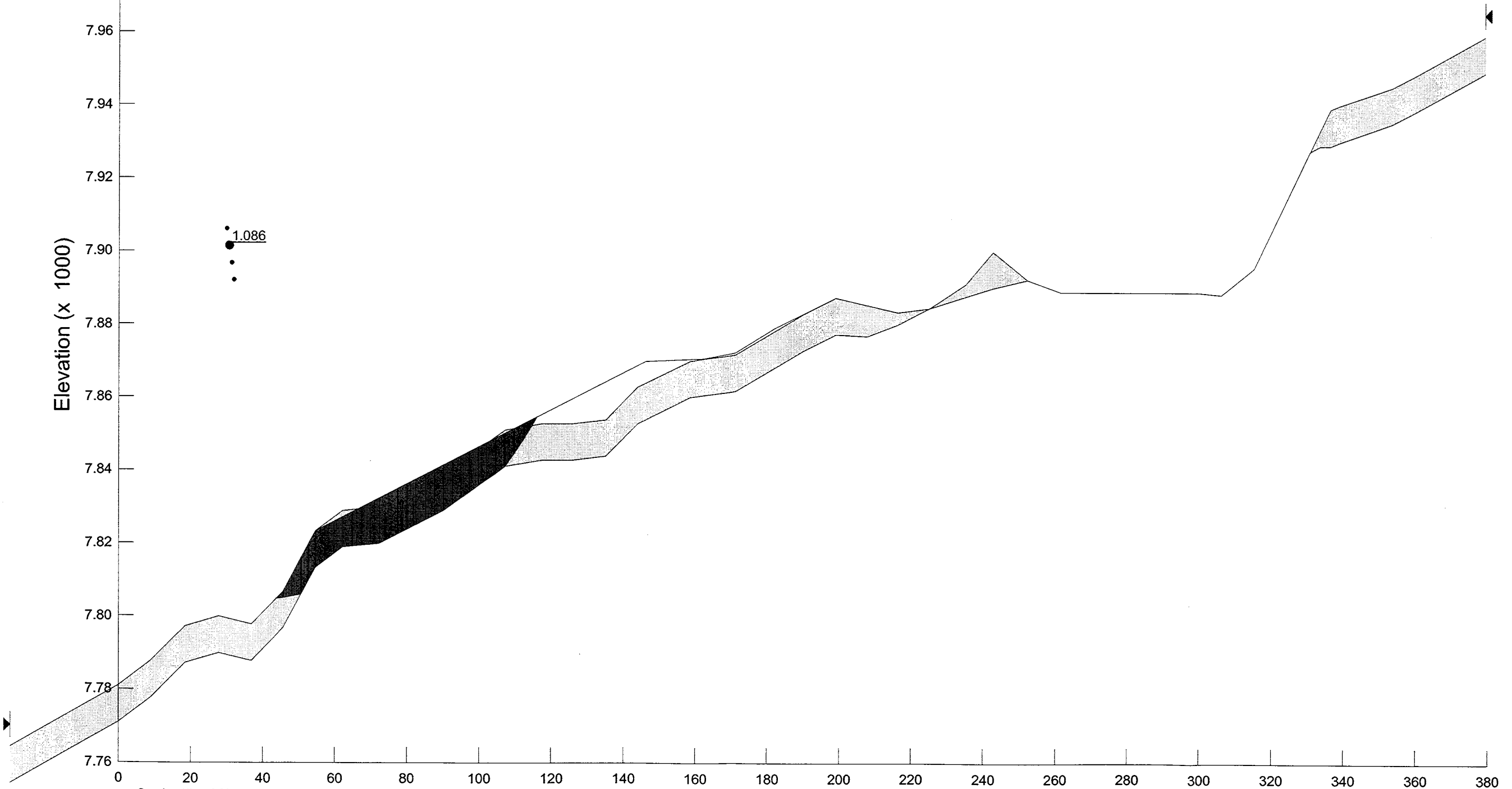


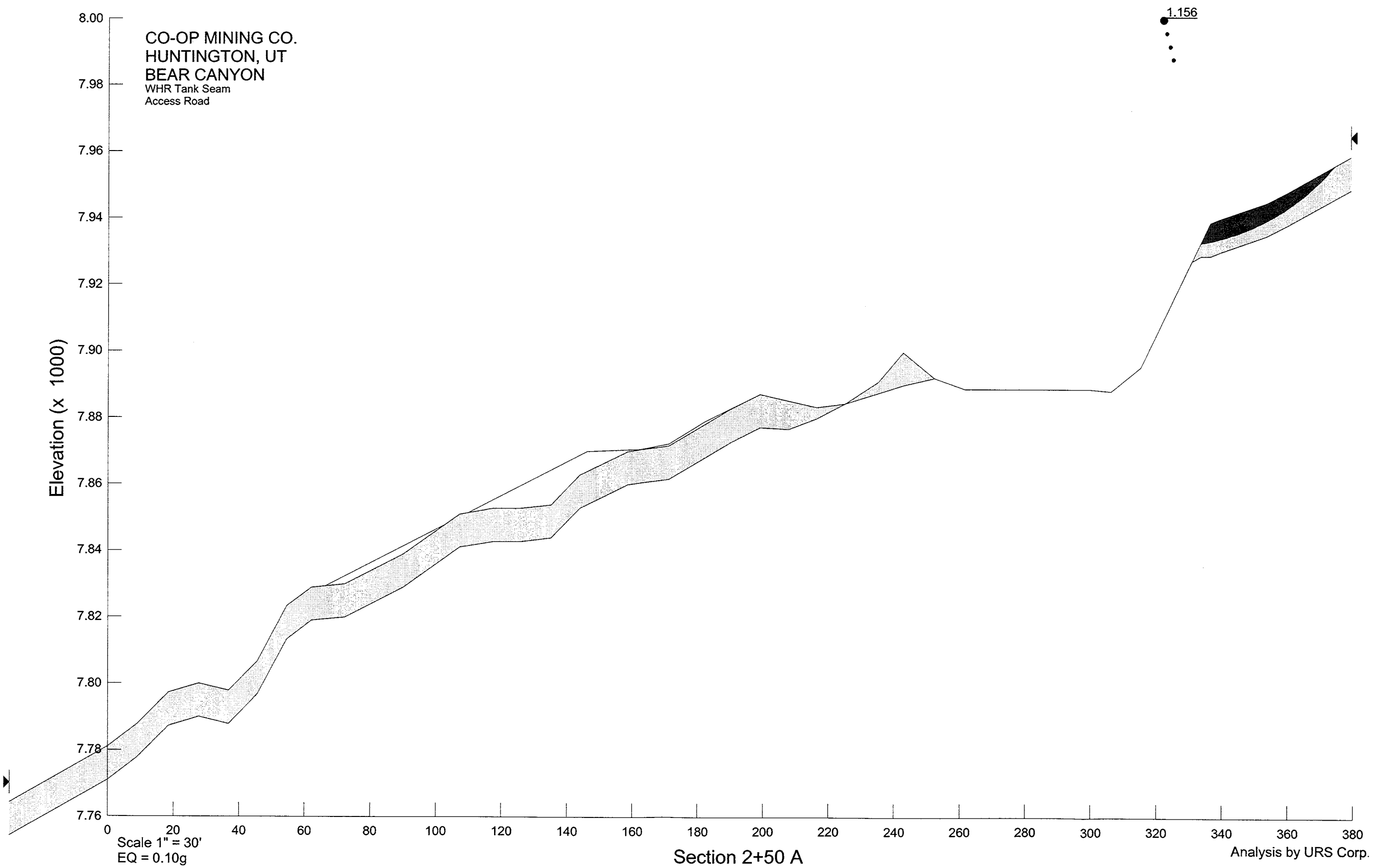
CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road

Elevation (x 1000)

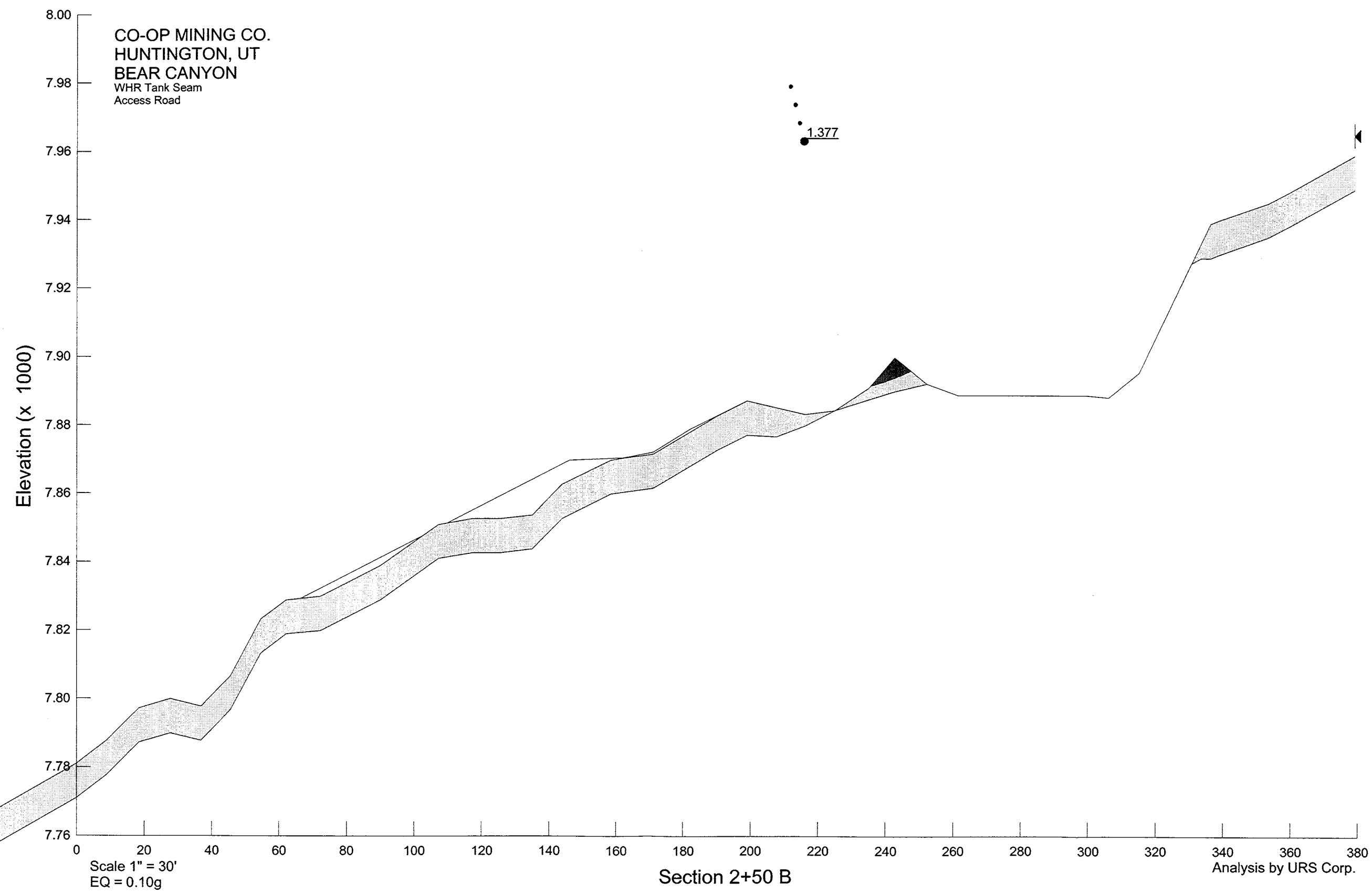
8.00
7.98
7.96
7.94
7.92
7.90
7.88
7.86
7.84
7.82
7.80
7.78
7.76

•
• 1.086
•
•

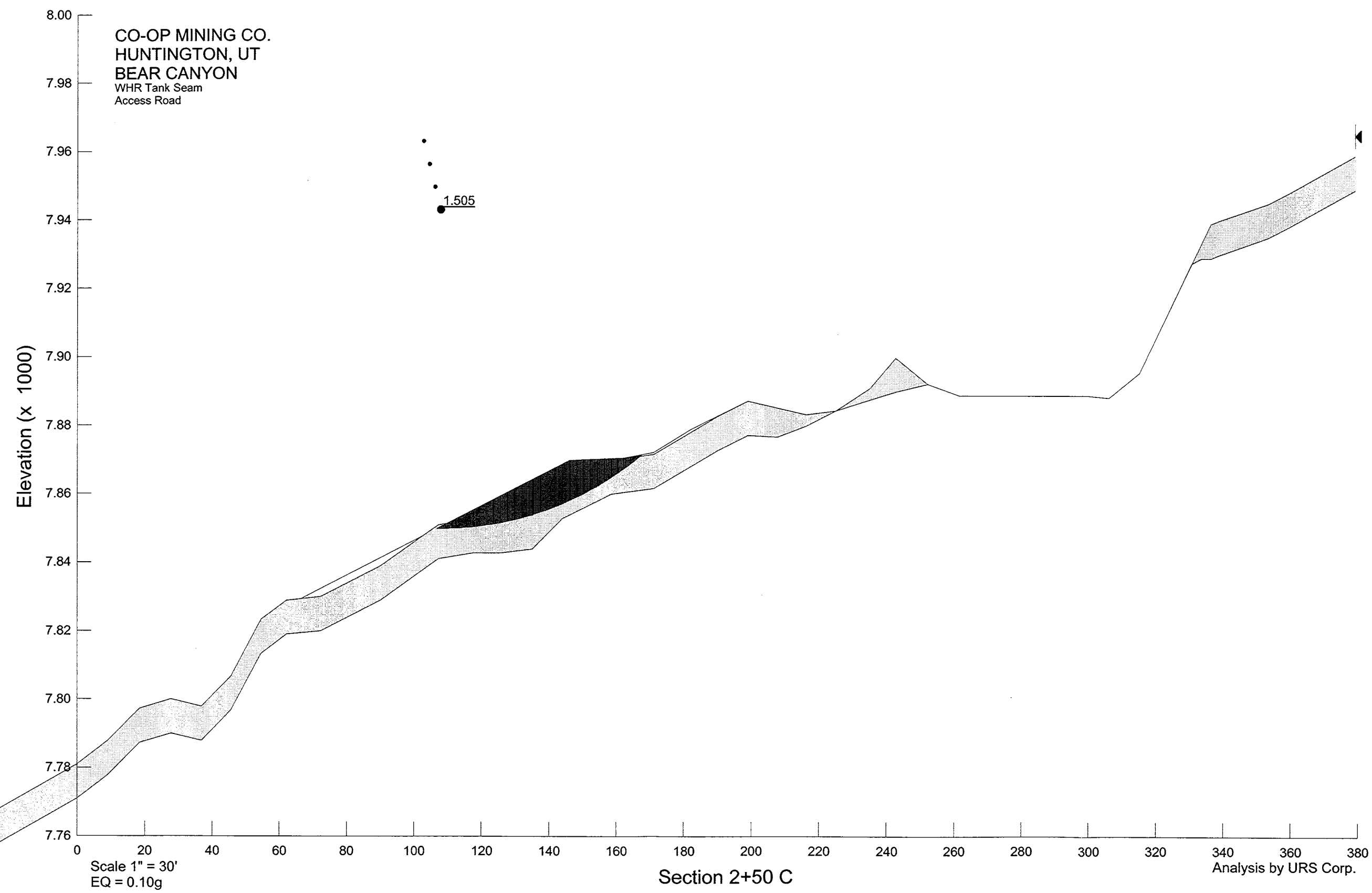




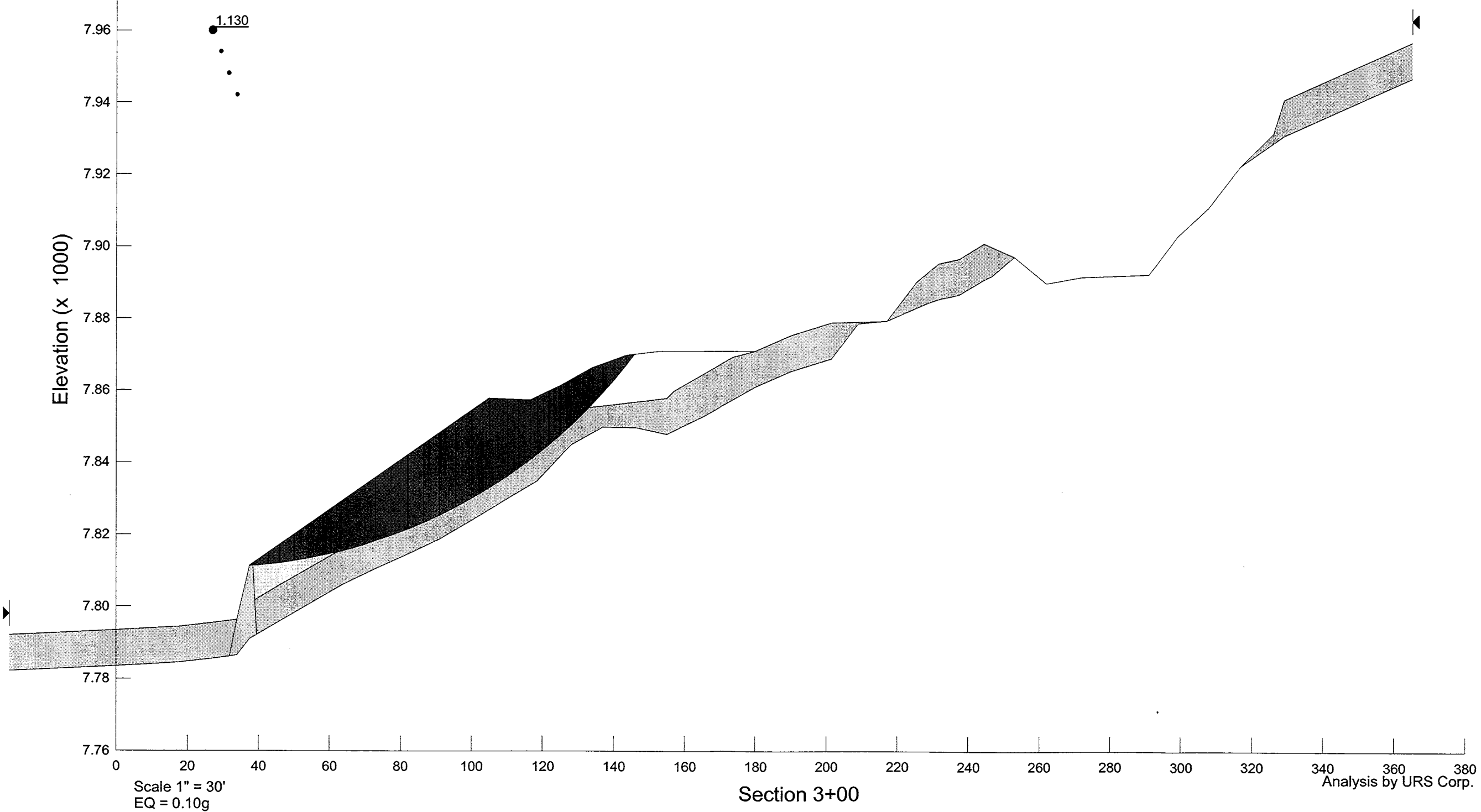
CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road



CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road



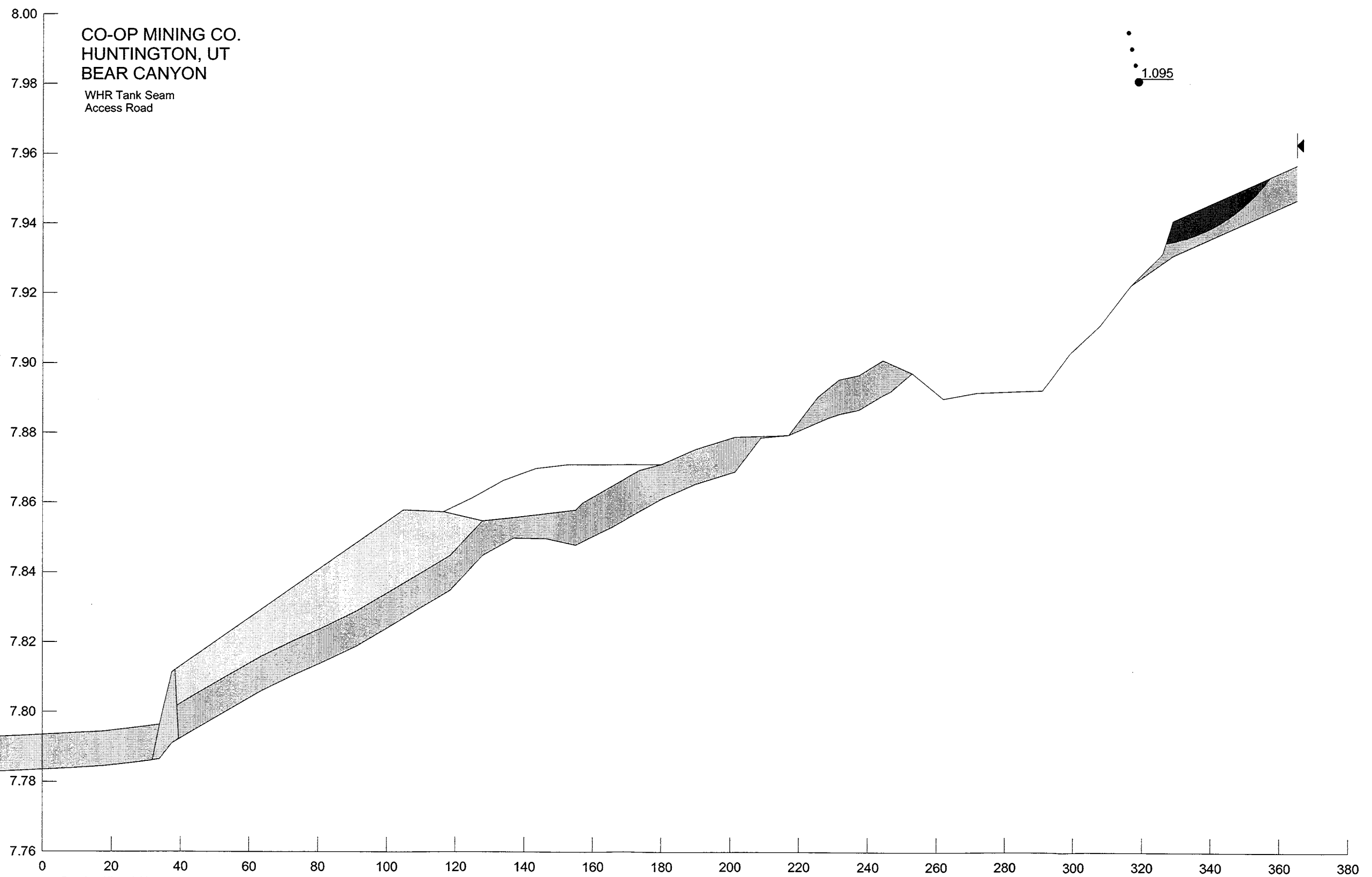
CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road



CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road

1.095

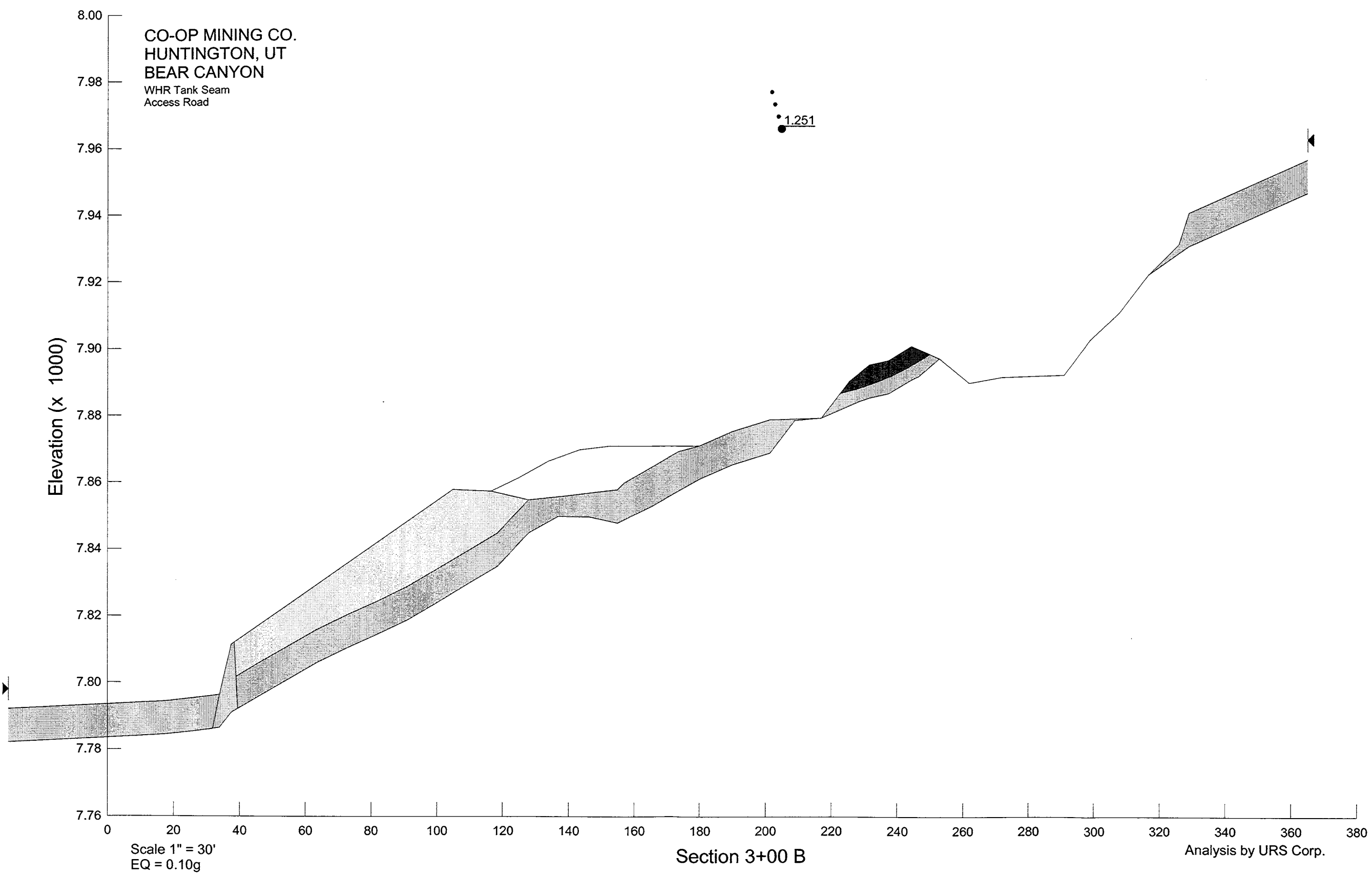
Elevation (x 1000)

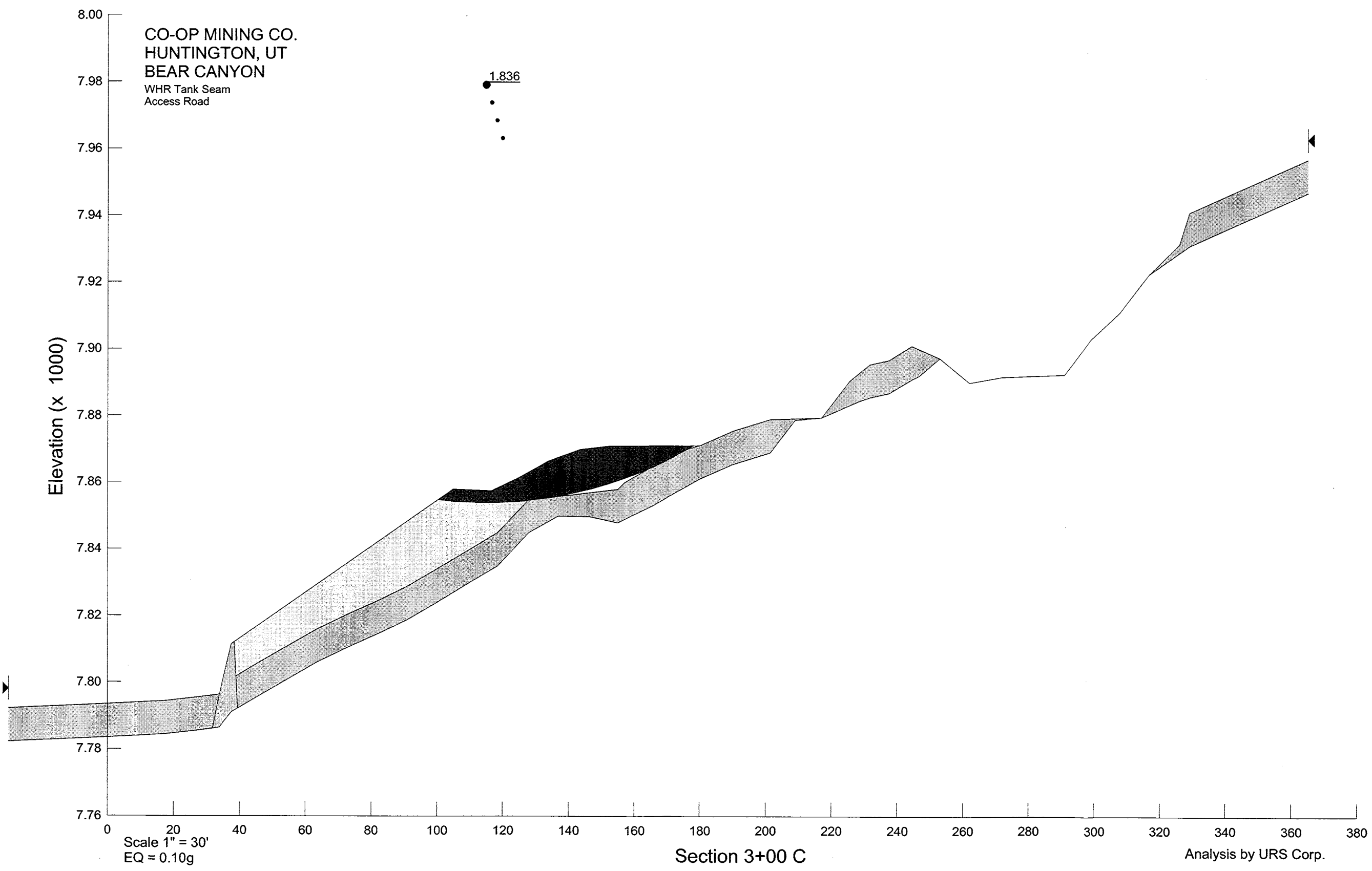


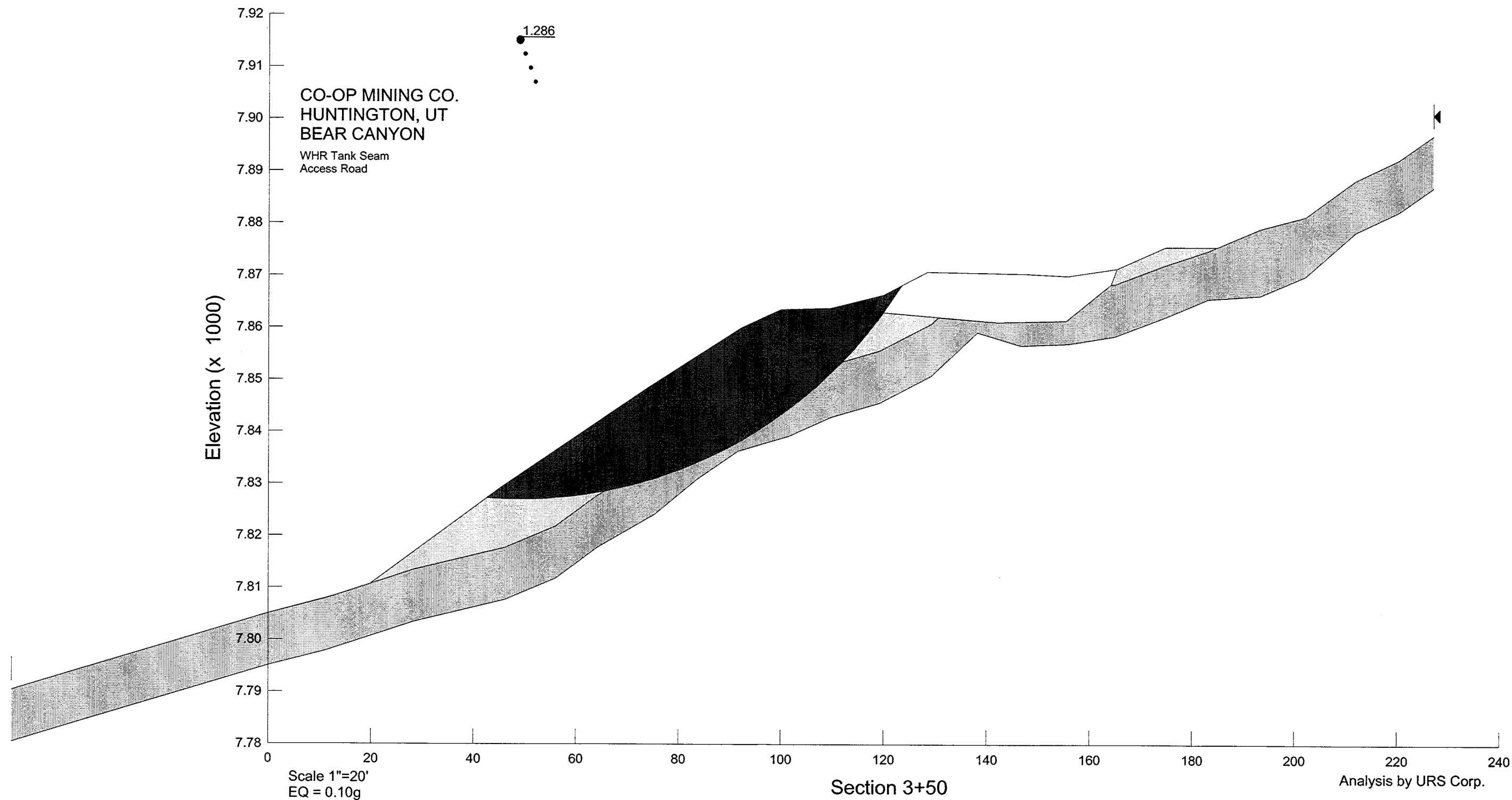
Scale 1" = 30'
EQ = 0.10g

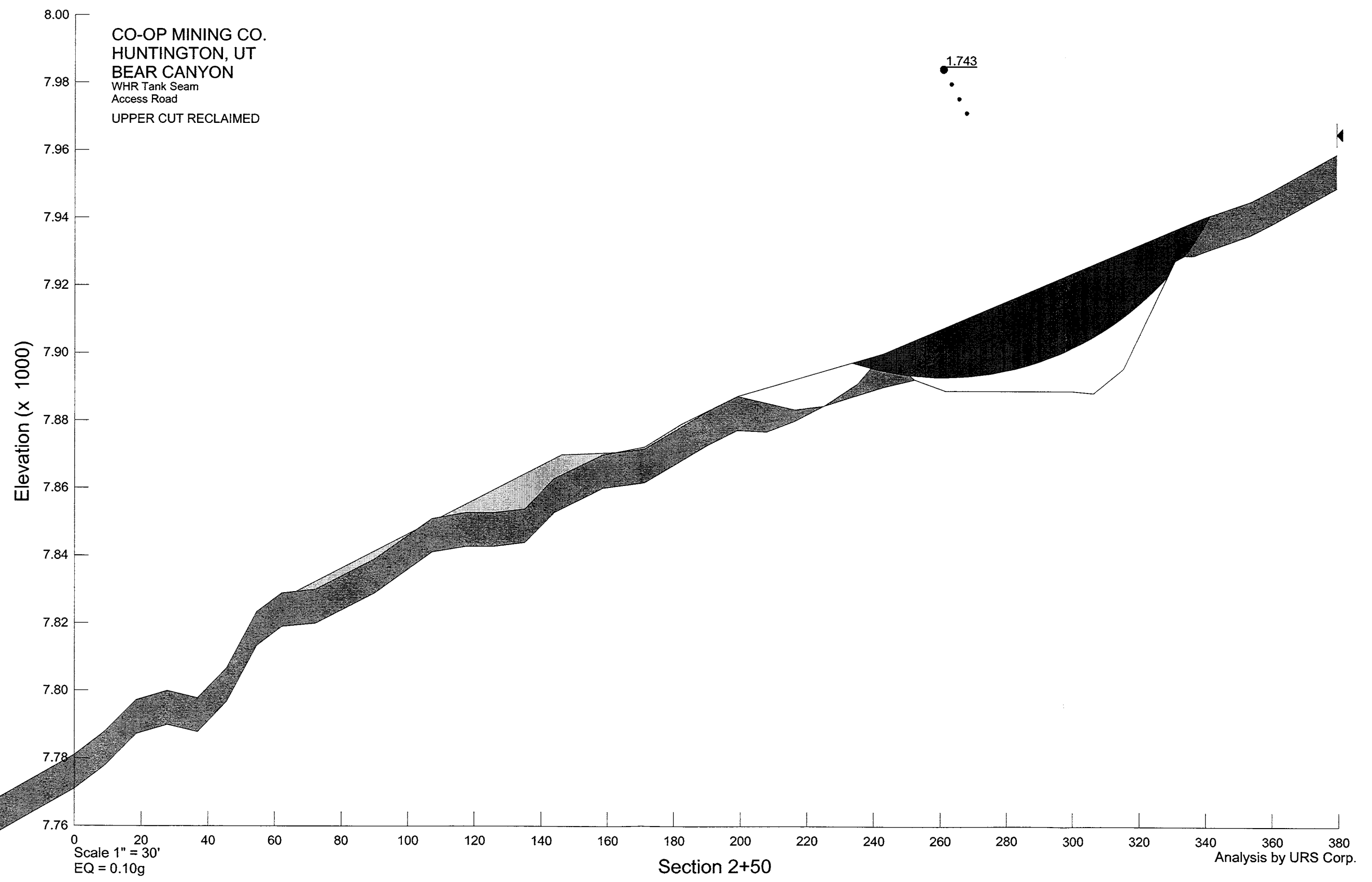
Section 3+00 A

Analysis by URS Corp.









CO-OP MINING CO.
HUNTINGTON, UT
BEAR CANYON
WHR Tank Seam
Access Road
LOWER CUT RECLAIMED

Elevation (x 1000)

8.00
7.98
7.96
7.94
7.92
7.90
7.88
7.86
7.84
7.82
7.80
7.78
7.76

0
Scale 1" = 30'
EQ = 0.10g

Section 2+50

Analysis by URS Corp.

1.826

